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Dearer Coal

THE most serious consequence of the rise in the pithead price of coal on May 3 must be its effect on industry. The railways will have to pay 4s. 4d. a ton more for the large coal used for locomotives; this rise incidentally compares with an average rise of 2s. 10d. a ton in the price of coal, the greater increase in the case of large coal being based largely on its scarcity value. The additional direct cost to the railways will be about £3,000,000 a year, besides the higher cost of steel and steel products, which must be found through economies in operation, or as a last resort by increasing rates. The effects on industry will be far-reaching. The additional cost per ton is stated to be 2s. 11d. for iron and steel and 1s. 5d. for electricity, with an average of 2s. for general industry. An appreciable rise must be expected in the price of steel. How far this will result in an inflationary trend remains to be seen, but heavy industries such as locomotive building and the manufacturers of other railway material cannot fail to be affected by the price of steel alone, apart from dearer electricity and gas and coal consumed directly and indirectly. They were committed only a few days ago to the heavy burden of the wage increases agreed for engineering employees, estimated to cost the engineering industries £60,000,000 a year, and the prospects of keeping export prices down have been correspondingly lessened. The increases in coal prices, being pithead prices, are not attributable to higher railway rates, though these as they have occurred from time to time have added to the costs of coal consumers, and increases in railway charges have increased the outgoings of the National Coal Board as a railway user apart from the movement of coal. The temporarily reduced summer prices for some grades of domestic coal, to encourage stocking, may have some effect on coal movement over the railways, but without a strong public response to the lower prices this seems unlikely to be considerable.

International Union of Railways

BRITISH participation in the activities of the International Union of Railways included the holding of the half-yearly meeting of the Editorial Board of the I.U.R. *Documentation Bulletin* in London, on the invitation of the British Transport Commission at the close of last month. Monsieur R. Dugas, Directeur des Etudes Générales, French National Railways, presided, and representatives of other member administrations of the union included Monsieur Schouleur, Belgian National; Dr. Kurze, German Federal; Signor Valdivieso, Italian State; Señor de Lasala, Spanish National; and Dr. Britt, Swiss Federal Railways. Monsieur Tougne, Director of the I.U.R. Documentation Bureau, is Secretary of the Editorial Board, and the two British representatives attending were Mr. W. B. Addinall, Continental Traffic Committee, and Mr. C. E. R. Sherrington, British Transport Commission. On the invitation of Sir Thomas Kendrick, a technical visit was paid to the British Museum Library to study the cataloguing and classification methods.

British Industry and Overseas Markets

AN increasing struggle with competitors but with vigorous salesmanship and other constructive efforts to increase markets and raise the standard of life at home and abroad, to help development, and to put customers in a position to buy more from Britain, were foretold for British industry by Sir Harry Pilkington in his presidential address last week to the annual general meeting of the Federation of British Industries. Co-operation and competition, he states, can and must exist together in the interest of consumer and producer alike: increased productivity owes much to the exchange between competitors of information on technique and good practice. He maintains that increased trade with Iron Curtain countries can be accompanied by an increase in trade with all other parts of the world; and he deprecates restrictions on trading, emphasising that the F.B.I. has tried to eliminate payment bans and quotas. On the other hand the effect of Governmental incentives in some industries is exaggerated; some examples prove that the mere existence of a German incentive scheme is sometimes claimed to be the only reason for losing orders at prices far more different than could be explained by the existence of any known system of incentives. The Government must reduce expenditure and, consequently, taxation, as has been done in other countries so that British industry may equip itself to compete in markets where price now is the dominating factor.

Anglo-Persian Trade Prospects

ALTHOUGH diplomatic relations have been resumed between the United Kingdom and Persia, British manufacturers eager for Persian custom must face strong competition from countries, notably Germany, which meanwhile have strengthened their trade with Persia. The method of payment of Persian oil revenues is still to be settled and will greatly affect the prospects for trade between

us and Persia; moreover, the Persian Government has accepted large loans from both French and German firms for the purchase of machinery and other items. The successful conclusion of negotiations between the British and Persian Governments for the delivery of 24 2-10-2 locomotives built by the Vulcan Foundry Limited may augur well, however, for the supply of other railway equipment from this country. The order for these locomotives was originally placed with Beyer, Peacock & Co. Ltd. in 1940, but because of that company's full order book was sub-contracted to Vulcan; the locomotives have been awaiting shipment since Anglo-Persian relations were broken off. They are identical with 40 Vulcan-built locomotives already in service and described in our January 30, 1953, issue. The Trans-Persian Railway linking the Caspian with the Persian Gulf, completed in 1938, is part of a comprehensive programme of construction, now in progress, which eventually will connect Persia with the Turkish and Pakistan systems. Equipping these new lines should afford plenty of scope for British participation.

Steelmaking Capacity

IN a supplement to the figures of steel production for March, 1954, the Iron & Steel Board comments that new steelmaking capacity at Consett and the full operation of the steelmaking furnaces installed last year at Lackenby, with benefits to be expected during the year from additional capacity on the North-East coast and in South Wales, is likely to give a possible production of 18,500,000 tons of steel in 1954 " if this output is required." The results of the census of finished steel held by consumers suggest that this production is likely to be required. Stocks in the second half of 1953 rose by only 10,000 tons, compared with 170,000 tons in the first half of the year. Thus the high rate of delivery in the latter part of last year must have been flowing, generally speaking, into current production. The Board reports that the heaviest demand is still for flat products and despite an increase in consumer stocks of plates amounting to 105,000 tons during 1953, it is understood that the British Transport Commission is still finding difficulty in obtaining sufficient plates from its regular suppliers.

Punctuality in Difficult Conditions

THE fine performance of the Southern Region during the difficult weather in the four weeks ended January 30, with working affected by ice and snow in the first and last weeks of the period, is referred to by Mr. S. W. Smart, Superintendent of Operation, in the current issue of the *British Railways Magazine, Southern Region*. The average late arrival of passenger trains was 2·02 min. for steam and 1·06 for electric trains, against 2·35 and 2·39 for the corresponding period of last year. For the nine days of ice and snow the combined average late arrival for steam and electric trains on weekdays was 2·24 min., whilst for the remaining 15 days, when normal conditions prevailed, the average was 0·82 min. The overall figure for the four weeks was 1·35 min. Mr. Smart, whilst praising the staff concerned for maintaining this high standard of timekeeping, points out that passengers contributed by joining and alighting quickly at stations and closing carriage doors. Freight train punctuality during the period also was of a high order.

Moving Brown Coal in Victoria

WHEN the Morwell briquette project of the State Electricity Commission in Gippsland, Victoria, is fully under way, the briquette output from four factories will fill two 16-ton wagons every five minutes. A full train-load of briquettes will leave Morwell every one-and-a-half hours, as well as the three or four trains which now run daily conveying briquettes from the existing plant at Yallourn to Melbourne. Movement of brown coal and briquettes from Yallourn is now expedited by the use of the new Moe spur line, described in our January 8 issue, which enables heavy coal trains to avoid the original, steeply-graded route between Yallourn and Moe. Clyde-General Motors diesel-electric locomotives have been hauling loads of up to 1,504 tons of briquettes and brown coal. This traffic will later be handled by English Electric-built 2,250 h.p. electric locomotives. The electrification of the Gippsland main line is due to be completed as far as Warragul in June, and ultimately will extend to Traralgon, some 100 miles east of Melbourne.

The Lahore Railway Training Centre

THE United Nations Railway Training Centre at Lahore, Pakistan, opened on April 3, is an important experiment in international co-operation, made possible through two organs of the United Nations, the Economic Commission for Asia and the Far East (E.C.A.F.E.) and the United Nations Technical Assistance Administration. The contributions made by the British Government and by British manufacturers to its equipment, and the provision by Britain of the services of the Principal Lecturer, were outlined in an editorial article in our February 26 issue, when the scope of the Centre was also referred to. Overall policy is laid down by an advisory board, which for the first year comprises representatives of Pakistan, India, Burma, the U.N.T.A.A. and E.C.A.F.E. Courses are being given only in English at first, but French also may be included in the curriculum. When fully operating, the Centre will offer each year three courses in operating and two in signalling, with about 20 students in each course. There are both a miniature railway and a full-size outdoor layout, much signalling equipment, photographs, films and slides and technical literature. The syllabus and the equipment decided on are the outcome of the world study tour which was carried out in 1952 by a party of senior Asian railway officers.

Fares Revision in Western Germany

ROAD and air competition are reported to be causing the management of the German Federal Railway to reduce the supplementary charges for use of certain categories of fast passenger train to simplify the complex arrangements for such charges. The abolition of the supplement for semi-fast trains (*eilzüge*) referred to in last week's issue is a step in this direction, as is the simplification, for reasons which include economy in ticket issue, and so on, of the system of extra fares for D and FD trains and FDt (high-speed railcars and diesel trains). These supplements, it is announced, are being made uniform, irrespective of distance: DM.2 for D-trains, with a further DM.4 for travel by FD-train or FDt, which for some longer distances will mean a rather lower total fare. Whether the principle of supplements for fast trains will be abandoned eventually in Western Germany in accordance with the general trend elsewhere in Europe, remains to be seen. In the forthcoming fares revision the basic fares are to remain unchanged, as are certain categories of reduced fare, with a general tendency towards facilities for faster travel by season ticket holders. Meanwhile the adverse financial situation of the Federal Railway remains.

Shelly Rails

NOW that the problem of transverse fissures in American rails has been mastered, attention is being directed towards another type of rail defect, the shelly rail, which has become increasingly prevalent. Compared with the transverse fissure, which develops in a vertical plane at right angles to the length of the rail, the shelly rail defect is a separation of the steel in the railhead in the horizontal plane at varying depths below the running surface. Recent three-dimensional photo-elastic investigations by the Engineering Division of the Association of American Railroads seem to dispose of the previous idea that fatigue due to shearing stresses might be responsible for the development of shelly rails. The root cause may be the constant reversals of stress in the rail, between supports, varying from high compressive to low tensile stresses. In the experiments,

the degree of shear produced in a rail specimen was far too low to account for failure, whereas the recorded reversal between compressive and tensile stresses sufficed to cause failure of railhead specimens under laboratory wheel loads. The investigations were carried out to scale, using a 132 lb. flat-bottom rail and a 33-in. dia. wheel, with the average tread contour of a worn wheel, as prototypes, and the test combined both vertical and lateral loading, so as to simulate normal track conditions.

Railways in Formosa

IN view of the present strategic importance of Formosa, and of its generally economically undeveloped state, it may be surprising to find that the railways began as early as 1887, and that by 1892 there were 66 miles of line. Later, under Japanese domination, extensions followed fairly quickly, and by 1943 there were 565 route and 1,000 track miles of public lines in operation. There was also a large mileage of long industrial lines in the sugar plantations and the forests, the total probably reaching nearly 1,800 miles before the war. It is understood that more of this type of line has been opened since the war, up to a total of about 1,850 miles. The latest mileage figures for the Taiwan Railways are 585 route and 1,050 track miles of 3-ft. 6-in. gauge. At the time of Japanese annexation in 1943, only about 55 per cent of the 294 locomotives on the island were serviceable; in 1952 there were 250 locomotives in service, with 570 passenger and 5,200 freight vehicles. In 1951 the average daily number of passengers was 200,000, and freight traffic averaged 17,750 tons a day.

The Ardrossan Bridge Accident

THE collapse of the No. 2 Parkhouse Road bridge at Ardrossan on April 26, 1953, was due to gross overloading, a very heavy engineering consignment having been routed over it by hauliers in Greenock, as a low bridge on the direct road to Glasgow ruled that route out. The bridge, built in 1878 with cast iron girders, was well designed and had been adequately maintained; but it was quite unsuited to such traffic. The accident was inquired into by Brigadier C. A. Langley, a summary of whose report appears in this issue. It brings out very strongly the paramount necessity of clarifying the whole position as to use of the highways for exceptional loads and establishing satisfactory law on the subject, with means of ensuring that it shall be respected and structures no longer overstrained in this manner. The problem calls for handling in a broad spirit, inspired by the single wish to do what is right and necessary in the national interest, so as to provide adequate means of transport, by road, rail, or water as circumstances may dictate as being for the best in each case, satisfying fairly industrial requirements, but operated under clear practicable regu'ations not permitted to be set at defiance. Admittedly the difficulties of doing so are considerable, but they must be faced and the sooner the better for all concerned.

Locomotive User on British Railways

DIAGRAMMING of locomotives in the early days of railway operating was very different from the form known today, and necessarily so, in that locomotives in many cases were designed for specific loads and routes. Maximum route availability is a feature of British Railways standard engines and the careful planning of the use of locomotives in relation to the demand for engine power to operate both passenger and freight trains is the only means by which maximum use of a locomotive can be obtained. The subject is dealt with in a paper read before the Institution of Locomotive Engineers on April 21 by Mr. L. C. Welborn, Associate Member, in which he gives many examples of present practice on British Railways. The point stressed is that the locomotive represents a substantial amount of invested capital and it is only while in operation that it is earning interest. With this object, the policy of increasing locomotive availability by more intensified diagramming and planned use is being pursued with vigour on British Railways.

Transport Problems in the Republic of Ireland

THE railways in the Republic of Ireland must have all the advantages of road transport which can be reproduced on rails. In putting this forward as a condition necessary for their survival, Mr. Frank Lemass, General Manager, Coras Iompair Eireann, in his paper "Public Transport in Ireland" read to the Irish Branch of the Institute of Transport on April 6, urges the need for greater interchangeability of staff, particularly at smaller stations, where the same man should be available for work on either rail or road. Trains on light density lines should operate on the same principle as buses, with a conductor to issue tickets en route. The possibility of the greater use of containers to reduce handling costs to a figure comparable with road operations must be explored. The Board of C.I.E. has decided to spend a considerable sum on re-equipping its railways. Its policy is to change, as soon as possible, to diesel power. During the period of re-equipment intensive research must be made in every field to provide the nation's transport at the lowest cost.

Those who have to provide public transport, Mr. Lemass points out, have a duty to keep before the public and the Government all the factors which affect the economic provision of transport. With greater use of the resources of public transport neither reduction of services nor subsidisation would be necessary. If this suggestion of more traffic for public transport is realistic, two conditions must be fulfilled. First, the traffic must be available. Secondly, the public transport companies must be able to carry the traffic if made available to them. In 1946 there were considerably more goods to be transported than in 1945 because of an increase in both the level of production and the volume of trade. In accordance with experience before the war, an increase in railway tonnage might have been expected, but it dropped slightly. The only explanation is that there were 874 vehicles more of over two tons unladen weight used by merchants and manufacturers to carry their own goods. If it is assumed that the railway might have expected an increase of 15 per cent, then approximately 400,000 tons of goods which would otherwise have moved by rail were carried in these additional vehicles.

In 1947 the volume of trade increased by 30 per cent and the level of industrial production increased by 8 per cent, but railway tonnage fell by 350,000 tons. The group of private road vehicles increased by another 1,800. Since 1945 the level of production of transportable goods has doub'ed, and the volume of trade increased by 150 per cent, yet railway tonnage in 1953 was lower than 1945. One-half at least of the Republic's potential total rail traffic is now carried by private hauliers. Vehicles of over two tons unladen weight have increased by 5,400 since 1945. If they carried on average only 500 tons a year they would account for an increase of 2,700,000, or more than the tonnage carried by the railways today. Extra traffic at most C.I.E. country stations would not involve additional staff. Often it would not involve additional wagons or additional trains. The average train load in Great Britain is twice as great as in Ireland and in Great Britain every mile of track carries eight times as much freight. The public cries out against the burden of subsidising railways without apparently understanding that it is paying for the right of unrestricted private transport for those who can use it economically. The £6,000,000 spent on the roads in the Republic goes almost unnoticed compared with the much lower expenditure on railway subsidy.

Sir James Milne, in his report on transport in Ireland, advocated a rates structure which would compete with the cost to merchants of carrying their own goods in their own vehicles. Merchants are able today to carry some types of traffic at costs lower than the railway rates applicable, yet higher than the special or additional railway costs involved. Although the railway rate structure might be criticised as being unsound in principle in the light of present-day road competition, it is difficult to find a workable alternative. It has been suggested that rates should be based on estimated road costs, subject to a minimum for marginal rail costs, but practical difficulties of application of this are considerable. In some circles, it appears to be the intention to charge rail traffic on the basis of more or

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less arbitrarily apportioned fixed charges. In 1928 Sir William Wood stressed the dangers inherent in such an attempt. It is not any one type of traffic which makes the rates structure vulnerable, but the circumstances of the particular merchant or manufacturer dealing perhaps in several types of traffic. There are therefore many practical difficulties in applying the general principles on which rates should be calculated to fight for this type of traffic. The change will have to be slow, piecemeal, and experimental, to avoid the risk of dislocating the national economy.

There is a limit to which one can reduce the capacity of railways. If all traffic were transferred to the road, Mr. Lemass considers, it is almost inevitable that the pattern of traffic movement would be different. This would be a material factor in calculating the number of buses and lorries that would be needed in replacement. Expenditure on the roads is at the rate of £10,000,000 a year. To calculate how high this would go if all these additional heavy vehicles were on the road would require intensive study. The social, strategic and economic considerations which demand the continuation of the railway system must eventually be evaluated. C.I.E. must use the most economic equipment. Costs must be controlled. Constant research must be undertaken to ensure that efficient standards are set and achieved. A reasonable output from employees of all grades must be expected. Restrictive practices must be eliminated. Efficiency and service are essential. Considerable economies have been achieved by the application of modern methods of cost control to road freight work. Not only has production increased, but the morale and interest of the staff has been improved. If the consignor were induced to arrange his traffic so that he has a regular programme, C.I.E. might effect substantial economies of which a worthwhile part should be passed on the consignor. The district organisations must be thoroughly integrated, so that when traffic is offered, local officials can decide promptly how it should be carried most economically.

New Works in East Africa

NEW works costing £5,000,343 were recommended for immediate execution by the Transport Advisory Council of the East Africa High Commission at a meeting in Nairobi on April 1. A major project is the relaying of 60 more miles of the East African Railways Mombasa-Nairobi main line with 95-lb. rails, 126½ miles having already been authorised for relaying. The released 80-lb. material is to be used for strengthening the Eldoret-Tororo section of the line, for the enlarging of yards and for use in rapidly expanding industrial areas. One of the principal recommendations affecting Tanganyika is for the regrading and realigning of the railway between Tanga and Korogwe to enable increased traffic to be handled more economically. This work includes the elimination of the notorious Bwembwela Bank, some 30 miles out of Tanga, which has presented an engineering problem and a serious obstruction to traffic operation since the Germans built the line at the end of the last century. In conjunction with the improvements now going forward at the port of Tanga this scheme amounts to a major improvement of the railway and port system of the Northern Province of Tanganyika.

Another important project which will give greater safety to the increasing number of trains between Mombasa and Nakuru is the installation of a system of interlocking signals and points at 63 stations. The contract for this work is estimated at £400,000 and is expected to take three years to complete. At Changamwe, near Mombasa, developments projected are estimated to cost over £1,250,000. They include the building of the main marshalling yard for Mombasa, erection of a new locomotive shed and sidings and provision for the handling of bulk oil fuel. These works entail the realignment of the Kenya-Uganda main line to give access to the site which will be adjacent to the future industrial area. Included in the scheme is a large staff housing project.

Improvements to inland waterways include the provision of a pier, goods shed, waiting shelter and quarters for staff at Karumo on Lake Victoria. These works should allow for the increase of both passenger and freight traffic expected during the next few years by the Sakumaland Development Organisation and the Nakasero Cotton Corporation, which are moving their ginnery from Mwanza to Karumo.

Additional living accommodation for European, Asian, and African staff will cost over £550,000, of which an amount of £41,000 is in respect of the first stage of a proposed Asian village in Nairobi. This estate, in which provision has been made for the siting of Government schools, besides the new combined Railway African & Asian Training School, shops and ancillary buildings, will eventually house from 5,000 to 6,000 persons in bungalows and multi-storey flats. More houses, mainly for Africans, are also to be erected at Dar es Salaam, Tanga, Eldoret, Nakuru and Mombasa.

February Traffic Trends

NO. 2 of the 1954 series of *Transport Statistics* shows some disappointing traffic trends in February. British Railways originated 22,953,000 tons of freight train traffic, 119,000 tons, or 0·5 per cent. less than in 1953. Merchandise and livestock tonnage was lower than in any February four-week period since nationalisation; it was 68,000 tons, or nearly 2 per cent, under 1953 and about 680,000 tons, or 15 per cent, below 1949. Mineral traffic was heavier by 64,000 tons (1·3 per cent), but coal and coke forwardings decreased by 115,000 tons (0·8 per cent). The Scottish Region lost 81,000 tons of coal (4·7 per cent), the North Eastern 51,000 (1·4 per cent) and the Western 22,000 (0·9 per cent), while the Eastern Region carried 34,000 more tons (1·5 per cent) and the London Midland had a small increase of 12,000 tons (0·3 per cent). During the first quarter of the year coal output varied greatly from week to week and in total was only 505,000 tons above the first quarter of 1953. At present there is little prospect that the quantity of railborne coal will expand considerably in the near future.

In February, British Railways worked 1,792,160,000 net ton-miles, a decrease of 49,634,000 (2·7 per cent). The Eastern and North Eastern moved a small additional ton-mileage; the Eastern was singular in recording more ton-miles for all classes of traffic. The London Midland Region worked 35,103,000 fewer ton-miles (5·2 per cent) and Scotland showed the larger proportionate decrease of 11,054,000 (5·6 per cent), coal ton-mileage north of the Border being 10·1 per cent down. Reduced despatches of coal were also the chief cause of a decrease of 74,000 tons (7·3 per cent) in traffic originating on Inland Waterways; ton-miles worked over these canals dropped by 2,274,000 (13·5 per cent).

In the month of January, passenger journeys originating on British Railways numbered 86,443,000, a decrease of 417,000 (0·5 per cent) from 1953 and some 2,600,000 less than the bookings in January, 1948. Increases of 101,000 in the Western, 182,000 in the Southern, and 16,000 in the Scottish Region were swamped by decreases of 480,000 in the London Midland, 122,000 in the Eastern and 114,000 in the North Eastern. For the first time since June, 1953, there was an increase of 8,000 (0·4 per cent) in the number of first class journeys, with an increase in receipts of £14,000 (1·5 per cent).

London Transport in February carried 43,801,000 passengers by rail, an increase of 106,000 (0·2 per cent), and 267,615,000 by road, an increase of 1,503,000 (0·5 per cent). The average rail fare was 7·4d. and the average road fare 3·3d. Provincial and Scottish road passenger transport carried 172,390,000 passengers in February at an average fare of 4·45d.; this was an increase on 1953 of 3,018,000 (1·8 per cent), the Tilling Group accounting for 2,515,000 more passengers (2·4 per cent) and the Scottish Group for 503,000 (0·9 per cent).

Increasing Railway Efficiency

THE joint consideration by the British Transport Commission and the railway trade unions, the National Union of Railwaymen, the Associated Society of Locomotive Engineers & Firemen, and the Transport Salaried Staffs' Association, of ways of increasing the efficiency of the railway organisation, which formed part of the wages agreement reached on December 16, 1953, has been in progress for some weeks. The first meeting was held on February 9, at which the Commission representatives are reported to have been Mr. F. A. Pope and Mr. J. C. L. Train, the Members specially concerned with railway matters, Mr. W. P. Allen, Chief of Establishment & Staff, and the Chief Regional Managers of the six Regions of British Railways. Further meetings are being held. As a great deal of the work of organisation must be done in the Regions, the Chief Regional Managers have appointed officers to investigate and report on the matters as they concern their own Regions.

Although some four months have passed since the agreement, it would be unreasonable to expect early announcements on progress made, for the subject covers many aspects of railway activity and far-reaching questions are liable to be raised in railway staff and labour matters. At the time of the December agreement, the Ministry of Labour announced that besides an examination of the wages structure to correct anomalies, give added incentives in desirable cases, and investigate standard rates of pay, the Commission and the unions would confer " to evolve ways of increasing the efficiency of the railway organisation, not only by . . . adjustments of wages and salaries . . . but by all other appropriate means."

The terms of reference of the meetings between Commission and union representatives, therefore, are wide. It has been assumed that consideration of hours, rostering, and conditions of work of railway servants is the principal means being considered of improving the organisation and achieving economies, by reducing the salaries bill, desperately needed to offset mounting costs, including the additional expenditure resulting from the December wage agreement. Apart from any question of hours worked, an impression is widely current, as was shown in the recent House of Commons debate on railway charges, that some railway staff are redundant or used wastefully. Even although this may be derived largely from observation of porters at passenger stations by laymen unacquainted, perhaps, with the uneven incidence of duties occasioned by train times, the question of redundancy no doubt will be closely examined, notwithstanding the efforts that are being made already, and have been made for many years at all levels in the railway organisation, to achieve economies in this direction.

Adjustment of hours and conditions of work which are problematically capable of producing economies may be considered under two heads: those which are effected by railway managements exercising their managerial rights, after consultation at the appropriate headquarter or other level with the union representative concerned; and those which involve alteration of existing agreements with the unions. Most aspects of railway work afford scope for adjustments in both categories which should result in useful manpower economies. An important instance is train crew workings. Much might be done, in the exercise of managerial rights as to working hours, and so on, to re-roster train crews, with very considerable savings in the number of enginemen and guards required. Dieselisation and its effects on footplate staff is a factor of growing importance. Another factor in this question affecting the operating department is that of lodging turns; where these are accepted by the unions, as they are in some instances, savings result in railway operating costs, and the men concerned are provided with good accommodation at very moderate charges in comfortable hostels. Other departments can offer similar if somewhat less scope for economies, though apart from control and other operating offices, there are necessarily fewer opportunities of this sort among clerical staffs. The whole subject, however, bristles with difficulties; there is, for instance, the natural fear of redundancy, especially where, with train crews, the manpower in certain depots and other centres may be strengthened at the expense of others, and a similar consideration applies to overtime where this has become customary. A complicating factor is the involved railway wages structure, especially in such matters as overtime and Sunday pay. This already is under examination under the wages agreement, but presumably some co-ordination is necessary with the question of manpower economy. The revision of agreements with the unions, with a view to matters such as the relaxing of limits to hours worked, or spreadovers, itself is a complex and delicate matter.

How far output as such can be studied in railway work is problematical. In other industries, much has been said about the necessity for increasing output per man-hour, and a great many yardsticks have been used in comparing present with prewar output, and productivity in this country with that in the U.S.A. and elsewhere. The railway geography of this country tends to invalidate comparison of railway output statistics with those of other countries. Most railway work, apart from workshops and offices, is *sui generis*, and certain social changes, such as reduced basic working hours, seem to have come to stay in the railway as in all other industries. Railway work lacks many of the attractions of other employments which tend to draw away from it existing and potential staff: regular hours, a five-day week, cleanliness, sheltered conditions, and so on; whereas other employments can offer not only more attractive pay and working conditions, but now afford, or seem to afford, the security which was a chief attraction of railway work before the war. These factors must be borne in mind when considering any alteration in railway working conditions.

The examination of the problem by representatives of the Commission and the unions must necessarily relate to quantities, to the counting of heads and hours. Whatever may be said about output, it is clear that much can be done by willpower and the determination to give of one's best in one's work. To engender and to maintain such an attitude among the men they lead is the task very largely of junior officers and of supervisory grades. A great deal could be done to encourage them in ensuring adequate financial reward for responsibility and in doing everything possible to enhance their status and ease their conditions of work, and this should be a primary consideration in the examinations of the pay structure and working conditions. No doubt the realities of the financial situation, with ever growing public opposition to increases in railway charges, to whatever extent the latter may be justified, will influence the unions in favour of drastic, if distasteful, steps to achieve economies.

Commonwealth of Australia Railways

THE report on the working of the Commonwealth Railways during the year ended June 30, 1953, a copy of which we have received from Mr. P. J. Hannaberry, Commonwealth Railways Commissioner, shows that the net financial results of the four constituent railways were as compared with those for 1951-52 in the table below:—

Railway	Gauge	1951-52	1952-53
		£	£
Trans-Australian Railway ...	4 ft. 8½ in.	64,405	54,110
Central Australia Railway ...	3 ft. 6 in.	114,481	10,596
North Australia Railway ...	3 ft. 6 in.	— 44,305	— 55,466
Australian Capital Territory Railway	4 ft. 8½ in.	— 17,263	— 27,101
Total	—	+ 117,318	— 17,861

Receipts therefore fell by £135,179 as compared with the previous years, but no less than £113,347 of this sum was due to a rise in expenditure on the Central Australia system from £1,188,459 to £1,301,806.

The Trans-Australian Railway earnings declined by £229,931, due mainly to the curtailment of connecting

goods-train services in Western Australia during the continuance of and for some time after the disastrous metal trades strike, but also to intensified road and sea transport competition, and to the changed financial position generally. On the other hand, the complete change-over from steam to diesel-electric traction was the principal factor in the reduction of working expenses by £219,636 despite rising costs of labour and materials. On the Central system earnings exceeded those in 1951-52 by £9,462, but the steep rise in operating costs mentioned above was due to basic wage increases, heavy repairs necessitated by floods, and higher costs of coal and other materials. The future running of diesel locomotives would, it was expected, improve the position materially.

The following are selected statistical results for 1952-53 compared with 1951-52:—

Heading	Year ended April 30	Trans-Australian Railway	Central Australia Railway	North Australia Railway	Australian Capital Territory Railway	Total for all railways
Miles open for traffic	1953	1,108	771	316	5	2,201
	1952	1,108	771	316	5	2,201
		£	£	£	£	£
Cost (excluding rolling stock)	1953	9,537,630	4,621,427	2,784,076	100,553	17,043,686
	1952	9,302,512	4,579,563	2,733,512	97,387	16,712,974
Cost of rolling stock	1953	5,056,089	1,419,351	239,644	†	6,715,084
	1952	4,031,950	784,917	128,188	†	4,945,055
Earnings	1953	1,326,335	1,312,402	51,040	20,119	2,709,896
	1952	1,556,266	1,302,940	47,386	18,894	2,925,486
Working expenses	1953	1,272,225	1,301,806	106,506	47,220	2,727,757
	1952	1,491,861	1,188,459	91,691	36,157	2,808,168
		Miles	Miles	Miles	Miles	Miles
Revenue train-miles	1953	820,283	839,497	68,734	9,705	1,738,219
	1952	972,184	842,034	65,720	8,985	1,888,923
		£	£	£	£	£
Results of working*	1953	+ 54,110	+ 10,596	− 55,446	− 27,101	− 17,861
	1952	+ 64,405	+ 114,481	− 44,305	− 17,263	+ 117,318
Interest	1953	102,149	129,251	57,421	915	289,736
	1952	102,708	130,886	56,060	930	290,584

* Excluding interest.
† Rolling stock is the property of the New South Wales Railways.

At the beginning of 1952-53 the Trans-Australian through passenger service of three trains each way weekly had to be reduced to two, as the Western Australian connecting services had been curtailed; but by August, 1952, it was possible to restore the third train, and in December of that year four trains began running. In spite of the reduced service, 48,320 through sleeping-car passengers were carried during the year, an increase of all but 6 per cent over the 1951-52 figure.

Trans-Australian goods traffic included road motor vehicle bodies, South Australian wine carried in bulk in stainless-steel tanks, tractors and agricultural machinery. The heaviest traffic on the Central railway is coal from the Leigh Creek coalfield; about 400,000 tons were being carried annually, but this quantity was to be increased considerably. It was also expected that the Rum Jungle uranium field would bring substantial traffic to the North Australian line.

As it was beyond the capacity of the Central Australia Railway 3 ft. 6 in. gauge line, with its steep gradients and sharp curves, to meet a much greater demand for Leigh Creek coal, a new standard-gauge line was being constructed from Brachina to Stirling North, a distance of about 160 miles. By June 30, 1953, excavation of cuttings was nearly complete; some 90 miles of earthworks had been finished, and 25 miles of track had been laid. In common with all future Commonwealth Railways relaying, this new line is being supplied with 270-ft. rails, each composed of six 45-ft. rails flash-butt welded together.

Eleven of the Clyde-EMD diesel-electric locomotives were running on the Trans-Australian line and were being used for all kinds of trains, having entirely replaced steam traction except for a few engines still used for shunting and ballast-train duties. Cost of working the diesels is stated to be less than one-quarter that of the steam locomotives, or about 43d. per unit engine-mile. The displaced steam locomotives, including 10 "Macarthurs," will be used on the new Stirling North-Brachina coal line.

Two new *de-luxe* nine-coach trains were received from Wegmann & Company, Cassel, during the year, and placed in service on the Trans-Australian line. The order for 80 open bogie wagon bodies and underframes from Metropolitan-Cammell Carriage & Wagon Co. Ltd., was completed during the year. Ninety covered bogie wagons were also received from Belgium, and ten 10,000-gal. tank wagons were delivered from R. Y. Pickering & Co. Ltd., Paisley. Arrangements were made for the supply of a number of "Gc" 70-ft. special wagons for the conveyance of up to 18 motorcar bodies in each. This stock was for the Trans-Australian Railway, and, in addition, the Central Australia Railway received 197 bogie wagons of four different types, and the 260 open bogie wagons for the Stirling North-Brachina coal traffic came to hand.

Letters to the Editor

(*The Editor is not responsible for opinions of correspondents*)

The Era of Diesel Motive Power

April 17

SIR,—With reference to the article on page 429 of your April 16 issue, news came today that on March 1 the U.S.A. railways had exactly 10,000 steam locomotives available for traffic and 15,907 diesels, complete as operated. In January and February no new steam or electric locomotives were installed, but 239 new diesel units were brought into use. The number of steam locomotives scrapped in the two months was 486 and on March 1 not a single steam engine was on order, while the railways expect early delivery of 10 electric units and 510 diesel units.

At this rate it cannot be long before steam power is almost completely abandoned in the States, though in 1933—the year before the Burlington and Union Pacific placed diesel-electrics for the first time in passenger train service—the railways owned 50,060 steam locomotives with an average tractive effort of nearly 47,000 lb.

Yours faithfully,

YOUR CORRESPONDENT

Westminster, S.W.1

Railway Operating Economics

April 12

SIR,—In his paper on "Operating Economics in Practice," read to the Railway Students' Association and discussed in your April 9 issue, Mr. A. R. Dunbar says 9 per cent of the wagon stock out of service for repairs means some £27,000,000 of capital value lying idle.

At least two-thirds of the wagons lying idle whilst awaiting repair are marked off for minor repairs and are still safe for service and could be earning revenue until repaired.

Some 30 years ago these wagons were kept in traffic until such time as the repairs could be done; nowadays, however slight the defect, the wagon goes out of service and if, as appears to be the case everywhere, the shops cannot accept, the wagon goes into storage sometimes for many months. Pilferage of floors and side planks, and damage by gangs of hooligans mean that a wagon which was originally marked off for minor repairs needs heavy repairs when it eventually reaches the shops.

These wagons could be kept in service by the re-introduction of the "Not to be loaded" label. This was used when a wagon was not safe for loading but was capable of running to the repair depot. The use of this label would cut the number of wagons waiting for repair by two-thirds, and so save £18,000,000 a year. It should be re-introduced immediately, as the heavy loss incurred by the present method is a luxury British Railways cannot afford.

Yours faithfully,

H. MORETON
Head Office Inspector,
Operating Department, Liverpool Street,
British Railways, Eastern Region

9, St. Anthony Road, Sheffield, 10

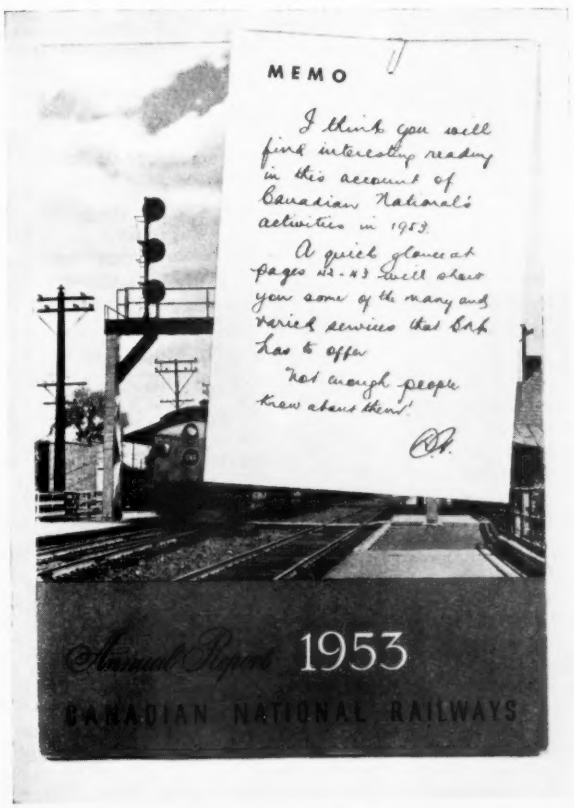
THE SCRAP HEAP

Horse Sense

The "Overland" express (between Melbourne and Adelaide) the last word in comfort and luxury for inter-State passengers, has attracted a new type of customer—the racehorse. Recently, seven well-known Victorian racehorses travelled in a horsebox attached to the express. They had engagements at the Adelaide Cup meeting. Incidentally, it was the first time that racehorses had patronised the "Overland" since the war. Trainers are beginning to see the advantages of the rail over the hazards and discomforts of the road. The train trip to Adelaide is not merely faster; it is cheaper than road float. Also horses arrive rested and in first class condition. It might, indeed, pay to watch their performances afterwards. — *From "The Victorian Railways News Letter."*

Interesting Reading

An autograph memorandum by Mr. Donald Gordon, Chairman & President of the Canadian National Railways, was fastened, as shown in the accompanying illustration, to copies despatched of the C.N.R. annual report for 1953, the subject of an editorial article in our last week's issue. The photograph reproduced on the front cover is typical of the high standard of the many illustrations reproduced in the report, which in layout and other respects presents an attractive appearance. This presentation of a railway report, with a message of this nature from a senior railway executive, is believed to be unique of its kind.


MEMO
I think you will find interesting reading in this account of Canadian National's activities in 1953.
A quick glance at pages 42-43 will show you some of the many and varied services that C.N. has to offer.
Not enough people know about them!
Annual Report 1953
CANADIAN NATIONAL RAILWAYS

Front cover of Canadian National Railways report for 1953, *with autograph message from Mr. Donald Gordon*

Labyrinthine Willesden

The junction (Willesden) . . . had developed from one set of platforms to three; two of them high level. This resulted in a muddle which became notorious as the stranger alighting on one platform would often find himself at an exit which was anything but the one he wanted. Indeed, it was popularly said that the station staff were passengers who, being unable to find their way out, had enlisted with the railway company.—*From "The Willesden I Remember," by B. C. Dexter, in the "Middlesex Quarterly."*

Early Railway Signalling

Every station is furnished with an alarum, to give notice of the approach of each train, and to summon the whole of the men to their appointed places. These alarums are so constructed, that a weight is wound up after they have performed their office which prepares them to perform it again. On seeing the forthcoming train has reached the proper spot, the policeman stationed there pulls a trigger, and the weight begins to descend, ringing a loud gong-shaped bell by means of internal machinery. Bells are also hung so as, in a few seconds, to collect together the whole of the men belonging to the station for any required purpose.

The police are placed along the line at distances varying from one to three miles, according as local circumstances render it necessary. Each man has his beat and duties defined, and is provided with two signal flags, one of which is red and the other white; the white flag is held out when no obstruction exists; on the contrary, the red flag indicates that there is danger, and that the man must not pass the signal till it is ascertained that the cause of danger is removed. Every policeman is furnished with a revolving signal lamp, to be used after dark; which shows, at the will of the bearer, a white light when the line is clear; a green one when it is necessary to use caution, and the speed of the train to be diminished; and a red light, to intimate the necessity of immediately stopping the train.—*From an account of signals at Birmingham in* 1839.

Good Friday Traffic, 1854

Yesterday (Good Friday) the influx of visitors from London into Windsor was very great, vastly exceeding anything of the kind since the first Good Friday after the opening of the Great Western Railway. The bulk of the passengers were conveyed by the South-Western line, the trains of which ran the same as on week days, the Great Western trains running as on Sundays. After 10 o'clock up to 2 o'clock each succeeding train by the South-Western disgorged its hundreds at the Datchet Lane station, and the town was crowded like a fair.—*From "The Times" of April* 15, 1854.

Opinion

Whilst listening-in, the other night,
Beside my fireside, warm and bright,
And seasonably wondering
Why winter lingers into spring,
I switched from unmelodious rhythm
And tuned in to a Mr. Witham.

This gentleman, strange to relate,
Had chosen to expatiate
On railways, and he thought it fair,
With criticism in the air,
To state that, though we're not precisely
Top of the world, we're doing nicely.

Some say they do things better on
The less congested Continong,
Where governments don't care a toss
For umpteen millions' annual loss,
Whereas our "effete" undertaking
Prosily goes on profit making.

The Shoe Lane press-gang, the next day,
Dashed doughtily into the fray.
They chilled each constant reader's
spine
With tales of lapses on the line
And more or less "Express"-ly stated
That British Railways are out-dated.

They claim that progress cannot dawn
Till every train is diesel-drawn,
Till every blessed mile of track
Goes "clicketty" without the "clack";
Pooh-poohing all production pow-wows,
They say we're going to the bow-wows.

Whose, then, is the authentic voice
On British Railways? Take your choice,
You pays your money, come what will,
For someone's got to foot the bill.
I'd say that, though they may be rusty
Just here and there, they're not so dusty.

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Rimutaka Tunnel

The boring of the 5½-mile Rimutaka tunnel, ahead of schedule by more than a year, will be completed by the middle of April, according to the contractors, Morrison, Knudsen & Downer, Limited. Of the total length, 1,150 ft. remains to be driven. From 1,500 ft. to 2,000 ft. of concrete lining will then have to be carried out. The contractors will then have ended their task 14 months ahead of schedule. They began in August, 1951, after the Ministry of Works had driven about 1,200 ft. of the tunnel, and they were given 48 months and one week in which to complete. Work proceeded slowly for eight or nine months early in the contract at the Mangaroa end, as frequent delays were caused by the soft, broken rock in the low western foothills. Water cascading through faults in the rock has given trouble at times, but delays from this reason have not been as serious as expected.

The contract price has not been publicly disclosed, nor have the details of the arrangement whereby the contractors receive a bonus for early completion. The estimated cost of the whole 15¼-mile deviation, which includes the main tunnel, is about £4,000,000. A decision is still to be made on tunnel ventilation. A ventilation shaft may be driven vertically about 300 ft. or 400 ft. into the centre of the tunnel, or ventilation may be afforded solely by fans or other mechanical appliances.

The present 25-mile route will be reduced to 15¼ miles and the present two-hour climb over the Rimutakas will be cut to 30 min. The six Fell engines which have been hauling trains over the mountains for 70 years will then be withdrawn. Operating costs will be reduced by £88,000 a year and the capacity of the line will be much increased.

CANADA

C.P.R. Stainless Steel Stock

Almost half of all the material being used in the 173 stainless steel coaches which the Budd Company is building for the C.P.R. will come from Canada.

The major items of Canadian material include air-conditioning equipment, couplers, drawgear, bogies, journal boxes and bearings, air brake equipment, parcel racks, air filters, radio and public address system, batteries, blowers, light fixtures, window sash, toilets, and seats.

The complete order includes 36 scenic dome cars, 71 sleeping cars, 30 day coaches, 18 dining cars, and 18 baggage-dormitory cars for use of train crews. The first of the sleeping cars is due for delivery in June, less than a year from the date of the contract. The day coaches will have reclining seats arranged in a 24-passenger smoking section and a 36-passenger non-smoking section separated by a glass partition. Four separate washing and toilet rooms are provided in each car.

Eighteen of the scenic dome cars are being fitted for day coach passengers. The dining cars, with room for 48 passengers each, will have star-studded ceilings and air-cooled stainless steel pantries and kitchens. Of the sleepers, 29 are of eight open sections, three double bedrooms, one drawing room and eight duplex roomettes; the other 42 comprise eight open sections, one compartment five double bedrooms and four roomettes. Some of the bedrooms in each type of car are capable of being used as a suite. The bedrooms and drawing rooms all have disappearing beds and form daytime living rooms with armchairs.

BOLIVIA

New Railcar Service

Running trials were recently undertaken on the Potosi-Sucre line of the Bolivian National Railways of two Paxman-engined diesel-electric bogie railcars, supplied by B.T.H. and with Wickham bodies and bogies, and they are now entering regular service over this 75-mile line through Betanzos and Yotala, lying entirely between 8,000 and 14,000 ft., through rugged terrain and with a ruling grade of 1 in 33. Despite the nature of the line and the metre-gauge track the top designed speed is 70 m.p.h., though this will never be attained in service. The cars are for accelerated schedules and have first-class accommodation only—44 seats in one saloon. The weight is 30 tons empty. The Paxman engine is pressure-charged to give an output of 230 b.h.p. at the 14,000-ft. level.

UNITED STATES

Railway-Owned Ore Deposits

Large deposits of iron ore, much of it rich in titanium, have been discovered by drilling in Albany County, Wyoming, and it is estimated that they may total nearly 240,000,000 tons. Part of the ore has been proved to average 46 per cent iron, 19 per cent titanium and one per cent vanadium. The titanium-bearing deposits may prove to be the largest in the United States. Titanium now is largely used in the building of jet aircraft, hence its strategic importance.

The iron-titanium deposits are in an area about 250 miles square, of which some 60 per cent is owned or controlled by the Union Pacific Railroad, and a 30-mile branch from the U.P. main line, between Laramie and Rawlings, has been surveyed to tap the district. The main line of the Colorado & Southern (a subsidiary of the Chicago, Burlington & Quincy) from Denver to Billings also passes near the area.

Another Cut in Family Fares

From March 1 the Union Pacific and Chicago & North Western have cut the rate for children of between five and twelve years of age, when travelling on the new family tickets, to one-quarter of the normal fares. As a further con-

American-Type Level Crossing in Holland

An American-type level crossing with half-width barriers on an electrified line of the Netherlands Railways

cession, while the entire family must travel together on the outward journey, the head of the household may return to the point of origin independently of the rest of his family without extra charge. This applies to all trains of both railways, except the Chicago suburban trains of the Chicago & North Western, and also over the Wabash to trains which are operated jointly with the Union Pacific from and to Kansas City and St. Louis.

SPAIN

Rates Increase

From March 15 the narrow-gauge railway companies have been authorised to increase fares by 20 per cent and rates by 25 per cent, with some exceptions.

Wage Increase

From March 1 the wages and salaries of all Renfe employees were increased by 10 per cent. Family allowances have been increased from 15 to 30 per cent of the total payroll.

FRANCE

Orders for 50-cycle Locomotives

For work on the new extensions at each end of the Valenciennes-Thionville 50-cycle electrification scheme, described in our March 19 issue, the S.N.C.F. has just ordered 55 locomotives of the same types as those now under construction, made up of 37 Co-Co with single-phase/d.c. converters, nine Bo-Bo with ignitron rectifiers, and nine Bo-Bo with single-phase commutator motors. Deliveries will follow completion of the earlier orders.

Palletisation of Stores Traffic

The S.N.C.F. General Store at Batignolles has developed a number of special type pallets for the movement within the store of commodities which cannot conveniently be carried on the normal-type pallets.

A pallet measuring approximately 3 m. × 1·4 m. (9 ft. 10 in. × 4 ft. 7 in.) has been constructed by joining two rectangular-shaped frames, made from light steel tubes, by means of short cross pieces 100 mm. (3·93 in.) in length. The two rectangular-shaped frames are welded to the cross pieces which keep the frames an equal distance apart, one vertically above the other; the pallet is faced at five points with oak boards. This pallet is used for the movement of materials such as plywood, and has enabled the unloading of a 15-*tonne* wagon of plywood to be completed in 14 man-hours instead of the 45 man-hours previously needed.

For the conveyance of long steel tubes and mouldings, a standard pallet is fitted at each end with a light steel framework which prevents the tubes from rolling off. A light flat bar across the top of the framework enables the loaded pallets to be stacked one on top of the other. In unloading a 10-*tonne* wagon of steel tubes, the new pallet is said to enable ten of the former 18 man-hours needed to be saved.

Use is also made of demountable sides to transform a standard pallet into an open-top container for the conveyance in bulk of small articles which would otherwise have to be packed individually. These containers are used for despatches to depots and stations, and are said to reduce handling costs by 30 per cent.

BELGIUM

Brussels-Ghent Electrification

On February 27, electric working was inaugurated between Brussels and Ghent. Until completion of electrification from Ghent and Bruges to Ostend, due in July, only trains terminating at or originating from Ghent are electrically hauled. There are eight such trains daily; the journey time between Brussels Midi and Ghent, a distance of 52 km., is 32 min.

Publications Received

Fares Please! The Story of London's Road Transport. Edited by O. J. Morris. London: Ian Allan Limited, Craven House, Hampton Court. 8¼ in. × 5¼ in. 176 pp. Price 12s. 6d.—Fifteen chapters by four different authors have been welded into an interesting book, under a title which gives little indication of the contents; the subject matter is shown in a sub-title "The Story of London's Road Transport," only on the title page. Eight chapters by Mr. Morris describe in detail the development of London trams and buses. Much of the story has not been told before, at any rate in book form. Later chapters, by D. W. K. Jones, S. A. Newman, and E. J. Smith, give a wealth of rolling stock information. An unusual feature is that the story has been related from an independent viewpoint; much previously published information of this kind has been given from the viewpoint of the old Underground Group.

Progress Reports of Investigation of Railroad Rails and Joint Bars (Fishplates), by R. E. Cramer and R. S. Jensen. Chicago. University of Illinois Bulletin. 9 in. × 6 in. 31 pp. Illustrated. Price 30 cents.—This investigation was conducted by the Engineering Experiment Station of the university in co-operation with the Association of American Railroads and the American Iron & Steel Institute. The first report is on control-cooled rails that had failed in service. Of 48 sent in, 15 had failed due to detail fractures from shelling, 13 due to transverse fissures from hot torn steel, but only 2 were the result of bolt-hole cracks. Rolling-load tests on fishplates are the subject of the second report, the 11th to have been made. No fewer than 79 out of 85 plates failed from the top surface, from cracks starting in gouge marks. The third report—again the 11th in series on the same subject—is on shelly rail investigations.

New Merlin Calimaster.—A diesel fuel injector pump calibrator known as the Calimaster has been evolved by the Merlin Engineering Co. Ltd., details of which are given in an illustrated leaflet recently issued by the firm. Features of the calibrator include instantaneous and positive calibrating from 100 to 600 shots in multiples of 100, and it covers the complete range of multi-cylinder pumps including A.B.N. and Z., ranging from one to eight cylinders. Speedy pump mounting is arranged, since no spanners are required.

Application of CO_2 to Machining Operations.—The Carbon Dioxide Co. Ltd. has issued an illustrated brochure giving relevant details of the CeDe Cut technique recently developed for the application of carbon dioxide as a machining coolant. For its application to metal turning the CO_2 jet is directed at the leading edge of the cutting tool, only the surplus coolant being allowed to reach the workpiece, while none reaches the chip. The essential importance of liquid CO_2 as a coolant is, that when expansion of the liquid to the atmosphere by flash evaporation converts part of it to gas, the consequent reduction in temperature converts a further proportion to a "snow" of solid CO_2 which, at atmospheric pressure, exists at a temperature of −109° F. In these conditions, the solid then sublimes directly into gas, and for every pound of solid thus gassified 250 B.T.Us. of heat are removed. It is said that as a result of more experience, with the results obtained so far, cooling of cutting tools by carbon dioxide will find a valuable place in industry.

Through All Europe by Train. Edited by the C.I.C.E. (Centre d'Information des Chemins de Fer Européens), Rome, and distributed free by European railway offices.—The edition giving abstracts of international summer passenger services in force from May 23 is intended largely for distribution in Canada and the U.S.A. Although travellers and travel agents in Europe probably require more detailed information, which they can readily obtain from many other publications, this booklet is useful in giving an indication of the journey times for the longer international journeys—and it has made a timely appearance well before the summer holiday season. It suffers inevitably from over-simplification caused by brevity; there are fewer than 60 pages of timetables. The introduction, if intended for travel agents in, and travellers from, America and other countries outside Europe, could well be enlarged to explain the passenger class arrangements on European railways.

XUM

Sixteenth International Railway Congress

Methods to Increase the Efficiency of Steam Locomotives

Increase in steam pressures, coal and oil firing, and feed-water treatment

DR. M. DIEGOLI, of the Rolling Stock & Motive Power Department, Italian State Railways, summarised replies from some Continental and overseas railways to Question 4 to be discussed in May by the International Railway Congress. The question relates to ways and means of improving the efficiency of steam locomotives. As the 1937 Congress brought the subject matter up to date at that time, the report deals with locomotives placed in service on Continental railways since that year, and developments which have taken place during the intervening period. Replies to Question 4 relating to railways in English-speaking countries, with British associations or where British railway practices largely prevail, were reported on Mr. C. T. Long, Assistant Chief Mechanical Engineer (Motive Power), South African Railways, a summary of whose report was published in our issue of February 12.

Increase in Steam Pressure

In so far as increases in steam pressures are concerned, increasing boiler pressure is recognised as of practical value in improving the power and efficiency of steam locomotives, but it is the opinion that, beyond a certain limit, it causes increased maintenance costs, and even time out of service. It is the general opinion that this limit may be between 227 and 256 lb./sq. in. The German Federal Railway considers the net efficiency of a locomotive boiler to be practically independent of the steam pressure, because if it is accepted that with equal superheat temperature, the superheater must provide a smaller amount of heat, while the boiler pressure is increased, the reduction is at the same time so small that it cannot affect the final result.

Trials undertaken with boilers pressed at 355 and 284 lb./sq. in. have not resulted in any important increase in the overall efficiency of the locomotive; on the contrary, they have given rise to numerous difficulties in service, which have resulted in increased operating expenses. Pressures were consequently reduced. The reasons for this are attributable more to the material from which the boilers were manufactured, rather than to the actual increase in pressure.

The Spanish National Railways prefer pressures of 227-241 lb./sq. in., as higher pressures, if giving a higher efficiency, are offset by increased maintenance costs. The French National Railways alone consider it would be beneficial in the building of new high-speed locomotives to increase the boiler pressure to 22 h.p.z., although they have not sufficient experience to decide at what pressure increased maintenance cost overrides the advantages.

Coal Firing

Administrations generally, with manual firing, besides the traditional fixed grate, which is still very common, favour the shaker grate when use is made of very cindery coal or with cinders which are more than usually combustible. With regard to the limit of hand firing, the French National Railways consider that a fireman can achieve a peak of three tons an hour, but that the average should not exceed 2-2·5 tons, which corresponds to a grate area of 45·74 sq. ft. The German Federal Railway finds it hard to fix a limit, as this varies with the class of locomotive and the service on which it is employed, in all cases the limit for hand firing generally corresponds to a grate area of 53·82 sq. ft. or a firing rate of two tons an hour. This opinion is very largely shared by the other administrations.

Mechanical coal firing is extensively used in France, where the S.N.C.F. has fitted stokers to 1,125 locomotives of 12 different types, which has in certain cases increased the tonnage hauled by 25 per cent. As to consumption of coal, it is stated that if the rate of vaporisation falls (for example, 7·07 in place of 7·26), the efficiency in cost per ton-km. hauled increases, following the better use of engine power. The emission of cinders is increased, and it is necessary to use suitable fuel: 30 to 40 per cent of volatiles and 4-5 per cent of non-combustible ash. Forty-nine tenders are equipped with coal pushers, but the actual firing is done manually; their use has not been extended.

Since 1950 the German Federal Railway has fitted 15 locomotives of two different types with automatic stokers using Hulson grates, and it is their opinion that it is of extreme importance to choose the right type of grate and fuel. Increase in consumption is in the region of six to ten per cent, plus four per cent, corresponding to the steam for operating the device. The R.E.N.F.E. has equipped four locomotives with mechanical stokers with a grate area of 57·04 sq. ft. and also reports increases in coal consumption which varies with the service on which the locomotives are employed.

The Bas Congo-Katanga Railway has recently ordered 12 Beyer-Garratt locomotives with a grate area of 57·47 sq. ft. fitted with mechanical stokers. The locomotives are being built in Belgium under licence from Beyer, Peacock & Co. Ltd.

Brick arches are considered an advantage, particularly with mechanical stokers. The S.N.C.F. is experimenting with brick arches of concrete.

Oil-Fired Locomotives

Oil firing has reached a high degree of efficiency and fairly wide adoption, which in some instances seems to be continuing. The R.E.N.F.E. at present has 25 oil-fired locomotives for passenger and freight services, and they expect to extend this method of firing to 400 locomotives by 1955. Because of coal supply difficulties, the Austrian Federal Railways equipped and kept in service until 1948, 192 locomotives for passenger and freight services, but the number has now been reduced to 34.

The Portuguese Railways have 183 oil-fired locomotives out of a total of 398 steam locomotives. They use, with good results, a type of burner where the pulverisation is done by inclined steam blasts distributed around the fuels exit, and often, to increase the effect, they reduce by about 15 per cent the section of the blast pipe. For fast-train services, when combustion must reach up to 200 kg./m^3/hr., the vaporisation coefficients are about 11 kg. of steam per kg. of oil, (10,300 cal/kg.).

The S.N.C.F. has fitted some 638 locomotives of different types, for fast, and mixed-traffic operating and also for shunting. The firebox is brick-lined in the lower portion, and in some instances with brick arches. The burner is located at the front with atomisation of the oil by steam, with air intakes suitably distributed, the oil is preheated in the tender.

Experiments with Other Fuels

Fairly satisfactory results are obtained on the Italian State Railways using lignite of 4,000-4,500 cal./kg. on freight services. Shaker grates are used with an area for the fire passage of air of about 46 per cent. Trials are being carried out with several locomotives fired by methane (C.H4). The firebox grate is replaced by a series of premixing burners. The burners are fed at low pressure by means of a decompression group fitted on the tender and connected to cylinders of 180 kg./cm^2, 3,982 lb./sq. in. also fitted on the tender, or by flexible tubes to a supply comprising a wagon of cylinders behind the locomotive. Maximum evaporation is at least equal to that obtained by coal.

Sixteenth International Railway Congress

Railway Controlled Road Transport Undertakings

Legal rights of operation: organisation and methods

A DETAILED questionnaire dealing with railway participation in road transport undertakings was circulated to 65 railway administrations in European and overseas countries. The answers form the basis of a report by Dr. G. Dreyer, Secrétaire Général adjoint of the Swiss Federal Railways, on Question 9 for consideration by the International Railway Congress in London in May. The questionnaire was drawn up in collaboration with Dr. J. P. B. Tissot van Patot, of the Netherlands Railways, an account of whose report was given in our issue of April 2. Because of the nature of the question only a small number of administrations could supply sufficient information to form the basis of a report.

In general, there is no legal barrier to the operation of road services by railways, but there are often restrictions springing from clauses of co-ordinating laws or from administrative practice which make it necessary to obtain special authorisation before road services can be operated. There are also restrictions on the freedom of the railways to use their road and rail services to the best advantage.

In Belgium, the railways were forbidden by the Ministry of Communications in 1946 to run throughout road services; and activities are limited to terminal operations. In Germany, the Federal Railway must be authorised by the Government of the province concerned to carry passengers by road; and in the case of freight traffic the number of road vehicles operated by the railway must not exceed 3·5 per cent. of the total of vehicles licensed for long-distance freight. There is no restriction on the number of vehicles which may be hired.

Some railways are reported to have extensive powers to use road transport to replace unprofitable railway services and to complete the railway facilities by offering collection and delivery services. This type of activity is usually conducted directly by the railways, but there is frequent use of contract and hired vehicles. Active financial participation in road haulage concerns, involving a share in the management, is limited to a few cases in Germany, France, Italy, and Portugal.

Hire of Vehicles

The Belgian National Railways not only operate road services through hauliers or by means of a separate statutory organisation, but also hire vehicles. In this last case the liability of the railway is limited to a three months contract. The hired vehicles can be used in any district as required, and the railways retain direct contact with customers. Passenger vehicles for certain services are hired at a rate for each vehicle-km., and the drivers are employed by the firm owning the vehicles. Fares are collected by railway employees. Special bus services for workmen are operated by private firms under a concession from the railways.

The Belgian National Light Railways operate road services replacing or feeding railway lines, under a separate statutory organisation. In cases where a bus service is proposed which is quite separate from the railway service, the railways may have a legal right to priority. When an application for a licence for such a service is made to the public authority concerned, the railway claims the licence and is then bound to find the capital to set up the service. The actual operation is then handed over to a private firm on a rental basis.

Statutory Organisation

Most administrations operate road services through separate statutory organisations, but the extent and size of these undertakings varies considerably. The size is usually small. The French National Railways operate certain services through their subsidiary company, the Société de Contrôle et d'Exploitation des Transport Auxiliaires, to which has been entrusted the management of passenger and freight services operating in conjunction with the railways. The railways hold 83 per cent of the shares in S.C.E.T.A., and eight of the twelve members of the board are representatives of the railways. The remaining shares are held by secondary railways and road transport firms.

The Austrian Federal Railways operate, under separate statutory organisation, services parallel to the railway and cartage services in Vienna and the main provincial cities, besides wagon transporter services on the Culemeyer system. The Portuguese Railways operate one road passenger service, out of eight services, under a separate statutory organisation, the remaining routes being hired out. The Luxembourg National Railways have a separate organisation for routes which have replaced certain steam and railcar services. The Belgian National Railways operate nine out of 65 collection and delivery services in this manner.

In several countries, such as Germany, Austria, and Switzerland, road services are operated by the postal administration. These are usually passenger services. Co-operation between railways and post office is particularly good in Switzerland, where the administrations provide many combined road-rail tourist and other services.

The French, German, and Italian administrations in their answers stated the aims which led them to operate road transport. The main reasons were to stimulate competition and make use of both road and rail techniques to rationalise the undertakings. These aims have not yet been fully achieved, largely because participation has been on too small a scale. The results are stated to have been sufficiently promising to show that the method should be extended. Some railways consider that long-distance bus services are a special field for railway endeavours and the Europabus services were often cited.

Parcels Services

Parcels services show some diversity of methods. The French railways are under an obligation to provide collection and delivery services for parcels in towns of more than 5,000 inhabitants less than three miles from a railway station.

The German railways are reported to leave parcels services in principle to private firms, but regular services are carried out on routes at some distance from the railway.

Some statistical information was provided by the undertakings, but the replies were too few to make useful comparisons. The German Federal Railway reports that the number of passengers carried by road represents 8·5 per cent of the total railway passengers and 5·2 per cent of the total passenger-km. The number of tons transported, 263,500,000, is 1·2 per cent of the total railway tonnage. Out of 435,000 employees, 10,000 are concerned with the operation of road services.

The investments in road transport are very small when compared with the total investments in railway undertakings and are frequently considered to be insufficient to achieve the objects of participation in road transport. No useful data were available on the costs of operating the road undertakings or on the receipts.

This general absence of information also makes it impossible to say whether the general financial results of the railways have been improved. There is general agreement that services to the public have been improved, but as yet influence on government co-ordination policies has been small. There are indications, however, that Governments have less hesitation in allowing railways to carry out road transport services when this is done through nominally autonomous undertakings, even although these are railway controlled.

XUM

New Marshalling Yard at Temple Mills

Concentrating the work of 15 existing yards

THE Eastern Region of British Railways recently received authority from the British Transport Commission to construct a new marshalling yard at Temple Mills, near Stratford, London, at a cost of £2,500,000. The new yard will replace a group of out-of-date yards and will result in an estimated net saving of £150,000 a year. The new yard will make possible a general speeding up of freight traffic between London, East Anglia, the Midlands, and the North of England. Operating efficiency will be improved. Equipped to modern standards, the new Temple Mills yard will be equal to anything of its type anywhere in Europe.

Location of Existing Yards

Temple Mills lies between two main junctions, Loughton Branch Junction and Lea Bridge Junction. It consists at present of ten yards as under:—

Up Side:
- Coal Yard, Blackwall Yard ... Main distribution up yards
- Old Suburban Yard, New Suburban Yard — Down yards on the up side—secondary sorting and reservoir
- Old Loughton Yard, New Loughton Yard — Up yards—secondary sorting and reservoir

Down Side:
- Cambridge Yard ... Main distribution—goods
- Colchester Yard ... Secondary sorting—up yard on down side
- New connection ... Main distribution—empties
- River Yard ... Reservoir

Dependent upon Temple Mills and very largely doing work to relieve it are six other yards on the periphery, none more than five miles away. These are: Goodmayes Up; Goodmayes Down; Thames Wharf; Beckton; Mile End; and Northumberland Park.

Traffic Flows

The Temple Mills group of yards deals with traffic to and from nine distinct directions as under:—

(a) *West:*
- (1) The North and Midlands via Whitemoor, the west side of East Anglia, the Hertford branch and the Lea Valley, via the Cambridge main line;
- (2) The exchange with the former Midland, G.C. and S.E.C. Railways via the Tottenham & Hampstead joint line;
- (3) The Chingford and Enfield branches.

(b) *East:*
- (4) The exchange with the former G.W., L.N.W., G.N. and L. & S.W. Railways, via the North London line;
- (5) The exchange with the former L.B.S.C. Railway, via the East London line and the traffic with Bishopsgate and Spitalfields terminals;
- (6) The imports and exports of Millwall Docks and Poplar;
- (7) The North Woolwich line, Royal Docks, Beckton and Silvertown;
- (8) The exchange with the former Tilbury line, via Forest Gate Junction;
- (9) The east side of East Anglia via the Colchester main line.

Uneconomic Working

At present Temple Mills comprises nine flat and one hump yard, the flat yards having as a result of the design limitations of such yards, a capacity of only about 1,000 wagons a day.

Almost every train, whether from east or west, conveys traffic for both forward and reverse directions. The present working is complicated, the existing yards having been built up and added to as a matter of expediency. Six of the yards, for example, receive virtually no traffic on direct trains, being fed by transfers from other yards. The uneconomic nature of the existing layout is shown by the fact that, whilst the total task, as represented by wagons

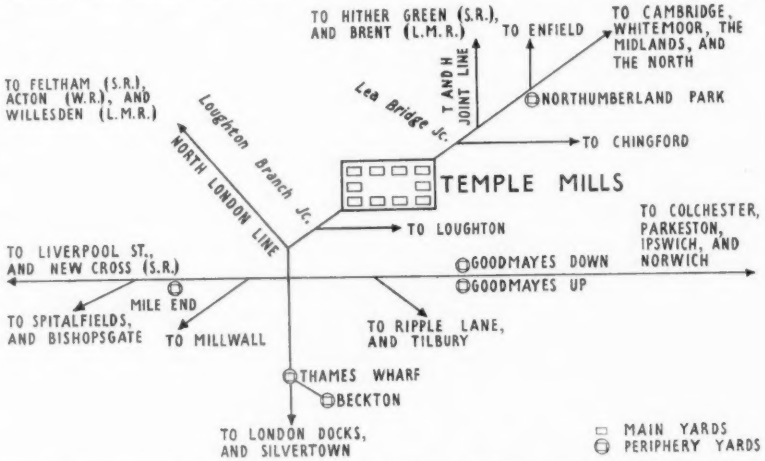
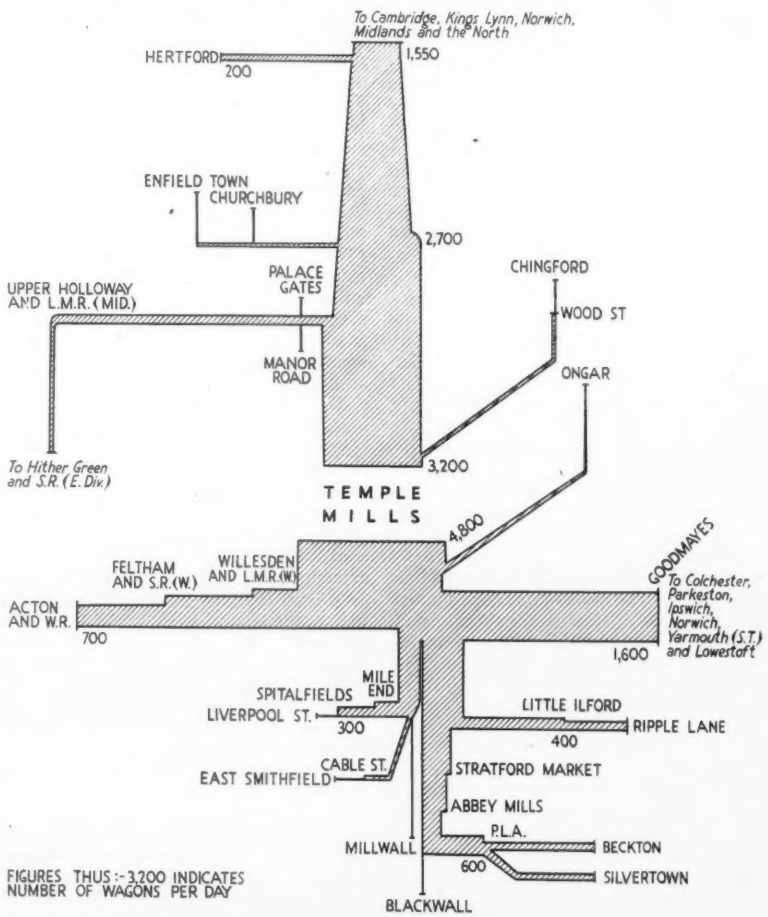


Diagram showing direction of traffic flows and location of existing yards



Traffic flows to be dealt with by new yard

moving into and out of the area, is something less than 5,000 a day, the total number of wagon shunting movements made in the 16 yards is not far short of 11,000. On an average, each wagon has to be shunted twice.

An added complication is that large numbers of empty wagons, many of special types such as banana and meat vans, must be held to meet fluctuating demands arising in the London Docks.

Purpose of Reorganisation

Wagons are at present in constant movement between the main yards and the periphery yards. This is costly, and results in wagons being detained for excessive periods. It has, therefore been decided to concentrate in one main distribution yard, supported by two reservoir yards, the work done by 15 of the 16 yards which at present exist. Only Goodmayes Down Yard will remain of the old yards.

Altered Layout

The new yard will have 12 reception lines, six of which will be entered from either east or west. There will be 50 sorting sidings, from 12 of which trains will be able to depart either east or west. All ten departure lines will enable trains to depart either east or west. Engine release lines, brake van storage lines, cattle pens, and cripple repair lines will also be provided, with a servicing depot for turning round locomotives.

On the south side of the yard and parallel with the sorting sidings will be five reception lines to be known as Manor Yard, for through down trains to be re-engined, remanned, or to attach or detach traffic. Allied to these reception sidings is a miniature hump which serves the southernmost 12 sorting sidings at the departure end of the main yard, so as to allow some secondary sorting of the express freight trains to Cambridge, Whitemoor, and Norwich. Main passenger lines will be routed south of the new yard.

The two reservoir yards to be provided will be known as East Yard and West Yard. Each will be provided with a miniature hump.

Special Features

Certain special features of the new yard are calculated to raise the speed of shunting. Beyond the crown of the main hump, for example, a release line is being provided to enable one humping engine to run clear so that a second train can be propelled from the reception sidings and humped without waiting. Special attention has been given also to the layout at the inlet to the reception lines to avoid humping engines running round, obstructing incoming trains.

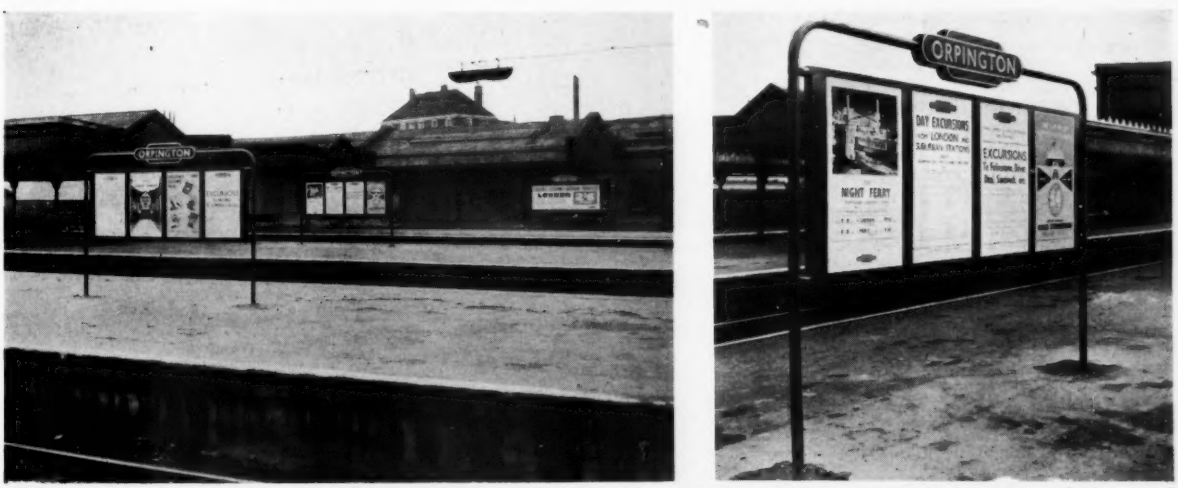
Another principal feature will be the design of the gradients and the provision for braking in two stages by primary and secondary retarders. Advance in design in these respects is expected to reduce the unproductive time of the humping engines in closing down from over 30 per cent in the older mechanised yards to less than 10 per cent.

The work now to be put in hand at Temple Mills will include new colour light signalling, track circuiting, and improved wagon repair facilities. Land will be used on which the present yards are sited and the new yard will be constructed while traffic continues to be handled.

When Temple Mills is complete there will be six marshalling yards in this country equipped with electric point operation and retarders. The others are: Whitemoor Up Yard (1929); Whitemoor Down Yard (1931); Hull Inward Yard (1935); Toton Down Yard (1939); and Toton Up Yard (1948).

View eastwards from hump in existing yard

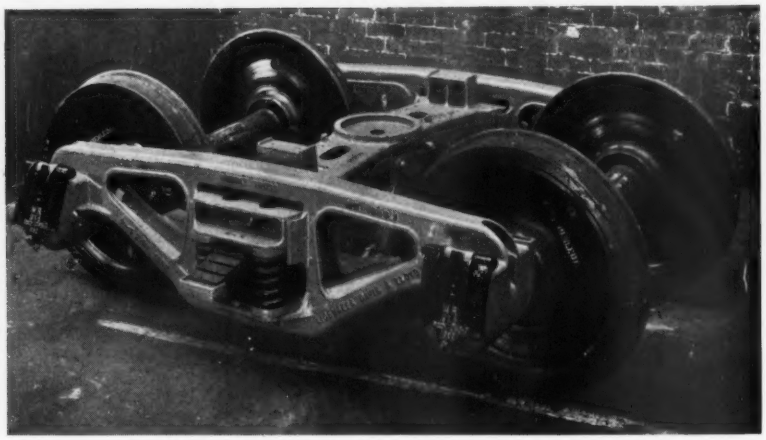
Combined Station Name and Poster Display



New station name tablets at Orpington, Southern Region, combined with poster display. The tubular steel structures are much cheaper than the standard type of name board and will probably be used at other suitable stations

Developments in Wagon Bogie Design

Cast-steel bogie frames and bolsters are being used for goods stock on many railways



Double-Truss bogie as fitted to Malayan Railway goods stock

THE adoption of the first four-wheel bogie carriage is usually attributed to Ross Winans who introduced the design on the Baltimore & Ohio Railroad in 1831. Its first appearance in Britain is thought to have been on the narrow-gauge Festiniog Railway in 1873. By the end of the 1870s, however, it had spread to some of the main-line British companies both for express stock and for the Pullmans which had just come into vogue.

For bogie freight cars, Arch Bar or Diamond frame type bogies have, in the past, been used extensively in practically all parts of the world including, until comparatively recent years, the United States of America. As more onerous conditions developed, however, such bogies were found to be uneconomical on account of the heavy cost of maintenance and so on, and as far back as about 1904, the railways of the United States began to put into service, bogies having cast-steel side frames and bolsters.

Recent Developments

These have now completely superseded the Arch Bar type in the United States, the Association of American Railroads having adopted in 1930 a regulation which prohibited their use after January 1, 1936. Basically, there are two designs, one employing springs without friction damping and the other, springs which are friction controlled.

Davis & Lloyd, Limited, 26, Victoria Street, Westminster, London, S.W.1, are licensed by the principal American makers for manufacture of the designs in Great Britain, and are also licensed for manufacture of Coil-Elliptic spring groups and Unit one-piece cast-steel brake beams. Under these licences the firm receive the benefit of the American foundries' experience. Double-Truss cast-steel side frames and bolsters of the non-friction type, but using all-coil or Coil-Elliptic spring groups have been supplied by them in large numbers for service on railways in South, East and West Africa, South America, Malaya, Egypt, Sudan, New Zealand, Iraq, and other countries

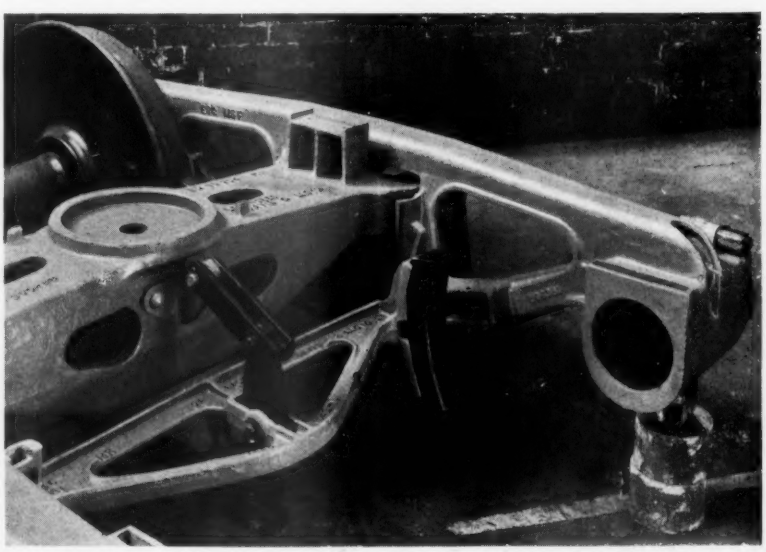
The bogies can be of either the plank or plankless type, but the self-aligning spring plankless type is now largely superseding the plank-type, as it gives better riding qualities with consequent reduction of wear on bogie guides and on wheel flanges and rails. There is also a reduction in cost and weight due to the elimination of the plank.

The Double-Truss construction gives a frame of great strength and rigidity with minimum weight and permits wide spacing of the bearing springs to improve stability. The frames and bolsters have self-aligning guides which tend to keep the bogie square under all conditions. In the majority of cases the brake hanger brackets and axleboxes are cast integral with the frames. The box-section cast-steel bolsters have great strength and rigidity because of the use of internal ribbing and, in most cases, are provided with pads for side bearings and with centre pivots, cast integral.

Coil-Elliptic Group

The Coil-Elliptic spring group was developed in conjunction with the Double-Truss side frame following American research into causes of damage to goods in transit. The group, which consists of one full elliptic spring situated between four coil bearing springs, provides efficient damping without loss of spring capacity and reduces the tendency to bounce, experienced with all coil spring groups.

Friction controlled bogies are a comparatively recent development and are more essentially for use in high-speed service. They have long travel bearing springs, although they can be designed for short travel springs, with adequate reserve travel and constant control of spring action. Prolonged tests by the Association of American Railroads, have shown that friction controlled bogies, using long travel bearing springs, give improved riding of wagons at all speeds with consequent reduction in wear and maintenance not only to the bogie parts, but also to wagons and



Malayan Railway bogie with wheels removed showing the Unit brake beam

Unit brake beam for Malayan Railway rolling stock with brake shoe and key removed

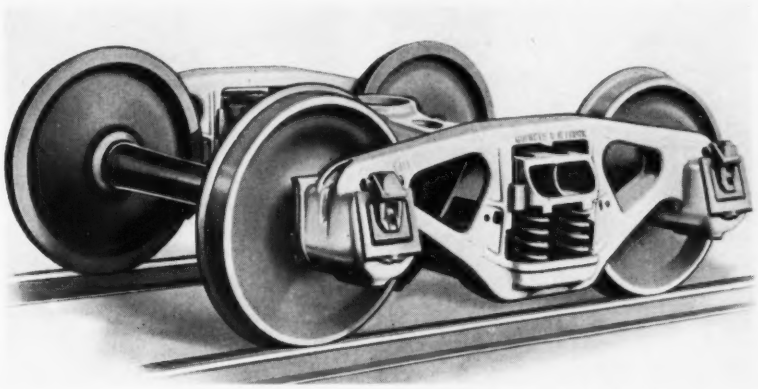
track. All types of bogies mentioned are suitable for use under locomotive tenders, and can be designed for use with roller bearings.

Unit Brake Beams

The Unit one-piece cast-steel brake beams are also a comparatively recent invention, but they have already been extensively adopted in the United States, where over 400,000 are now in use and they are being supplied by Davis & Lloyd Limited, for many hundreds of wagons at present under construction in Great Britain for shipment abroad. Unit brake beams have extensions cast integral which slide in fixed pockets cast integral with the side frames, thus eliminating the necessity for the conventional type of hanger.

With the Unit system the brake force is always maintained radial to the centre of the axle, thus ensuring full and even brake wear. The brake beams are self-aligning under all conditions, and faults common to beams of the conventional type, such as brake chatter and brake grab with consequent wheel slip, are eliminated, resulting in higher braking efficiency, easier car riding and improved wheel and brake life. Brake hanger brackets, hangers and pins, are eliminated, and no brake beam safety supports are required as the system is interlocking, and the beams are positively supported between the side frame pockets. The pockets in the side frames are fitted with easily removable hardened steel liners.

The brake beam is a simple one-piece casting with integral brake block holders which accommodate the separate keyed-in brake blocks. The end guides of the beams are flame-hardened and rubbing surfaces and other parts subject to wear can easily be restored to original dimensions by welding. The cast-steel Unit brake beam is of great strength and rigidity and one such type weighing only 80 lb. withstood a direct load of more than 30 tons without fracture. The beams are designed to meet individual railways' requirements. In most cases existing standard brake levers and rods can be maintained.



Cast-steel bogie with built-in friction control

Cattle wagon for Malayan Railway, built by Cravens Railway Carriage & Wagon Co. Ltd., fitted with Double-Truss spring plankless bogies with Coil-Elliptic spring group

XUM

Ultrasonics for Permanent Way Inspection

Lightweight electronic rail flaw detector

A PORTABLE ultrasonic flaw detector known as the Sonirail has been designed by Matisa Equipment Limited, for the non-destructive testing of railway track. Being lightweight and small, it can be carried by one man. It is easily operated, and simple to adjust.

The electronic apparatus, enclosed in a metal box, is connected to a probe stick which the operator slides on the rail. Indications are given audibly by means of a built-in loudspeaker, supplemented by visual signals on a milliammeter. Interpretation of the audible signals is easy, and after a few hours training an operator can identify common defects and estimate their size.

Rail joints present no difficulty in operation, and the equipment is particularly suited for checking at fishplates as it enables the state of the rail to be determined without dismantling the joint. The equipment is fed from a special dry battery, which can be easily changed and gives about 40 hours use.

Sonirail ultrasonic flaw detector being tested on British Railways, London Midland Region, showing probe stick and battery pack

Principle of Operation

A powerful ultrasonic beam generated by a piezo-electric crystal oscillator is sent into the rail, the crystal itself being in a casing at the end of the operator's probe stick. This beam is reflected back to the crystal from the bottom flange of the rail. The crystal is connected to an oscillator, the anode current of which varies rapidly every time the incident and reflected waves are in opposition. These variations are amplified, filtered, and then converted into audible signals in the loudspeaker (or headphones).

The note emitted varies according to the path followed by the ultrasonic beam. If the rail is sound, the note heard is about 800 cycles. If the rail has a horizontal crack, the path is shortened and the frequency of the sound becomes lower as the position of the crack approaches the surface of the rail. Fractured or deformed fishplate bolt holes are detected in this way. Where there is an oblique crack, only a small part of the ultrasonic waves returns to the transmitter, often after following paths of varying lengths, so that the sound diminishes in intensity or even disappears.

A hole of 2 or 3 mm. diameter deflects the ultrasonic waves, and results in a simultaneous lowering of frequency and intensity of sound. A larger diameter hole gives rise to much more complex phenomena. On the sides of the hole which give an oblique reflecting surface, the intensity continues strong. At the top of the hole, the reflecting surface is horizontal, and the sound has an intensity close to that normally associated with the lowest frequency. Intensity is strongly affected by the quality of the steel, but this has little influence on the frequency.

The transmitter-receiver unit is carried on the operator's chest by a harness which also supports the battery on his shoulders. It carries a main switch and sensitivity control, feed voltmeter with H.T. and L.T. scales, voltmeter switch, and plug connections to the battery, probe stick, and headphones. The loudspeaker is incorporated with the headphone plug and is fitted inside a cone which directs the sound towards the operator; a milliammeter forms part of the assembly. A switch fixed on the cone enables either the loudspeaker or the milliammeter to be used during rail testing.

The battery pack normally consists of a waterproof canvas bag carrying the H.T. and L.T. dry batteries and other accessories (such as spare crystal unit and spare cables). Lightweight accumulators of specially restricted size can be supplied on request instead of the dry batteries.

The probe stick is formed of two telescopic tubes which enable the length of the stick to be adjusted to suit the height of the operator. At its end is the crystal unit, consisting of a piezo-electric crystal inside a plastic box, the assembly being housed in a metal case for protection. A feeler guide is attached to the crystal unit to enable it to be maintained directly over the rail web by the operator. Alternative crystals are supplied for rapid searching with the probe or for locating very small defects.

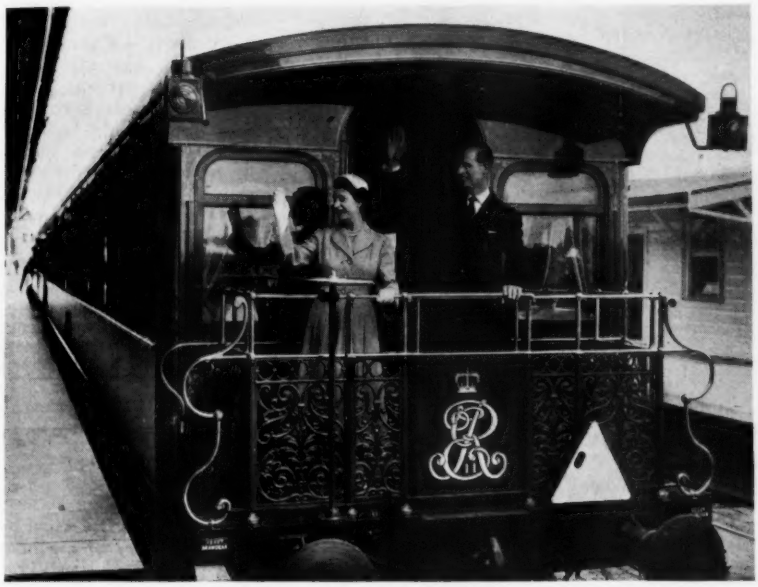
The telescopic stick is supplied in a waterproof canvas cover.

ZIRCONIATED TUNGSTEN ELECTRODES FOR ARGON ARC WELDING.—Zirconiated tungsten electrodes have been developed by Murex Welding Processes Limited for use in the argon arc welding process; they are claimed to have the advantage of greater resistance to contamination than the pure tungsten and thoriated tungsten electrodes which have previously been generally used in this process. Even if the zirconiated electrode is deliberately allowed to touch the molten pool and the filler wire during welding, contamination although present, does not "wet" the point of the electrode and form a globule on the tip, as in the case of pure tungsten and thoriated tungsten rods. It is said to be possible to continue welding with zirconiated electrodes after contamination when in similar circumstances, pure tungsten and thoriated rods would require immediate regrinding. These electrodes are slightly higher in price than tungsten electrodes, but it is claimed that economies in material and labour, and less interruption in the flow of work more than offset this.

INSTITUTE OF PHYSICS: NON-DESTRUCTIVE TESTING GROUP.—The summer meeting of the group (formerly the Industrial Radiology Group) will be held at Chancellor's Hall, University of Birmingham, on July 7-10. Subjects to be discussed include the theory and application of electrical and magnetic methods of non-destructive testing, on which a paper will be contributed by Mr. R. H. Wallace, of Metropolitan-Vickers Electrical Co. Ltd., and diffraction mottling, with a paper by Mr. H. S. Peiser, of Hadfields Limited. A panel of five will deal with questions in a forum on July 8; one of its members is to be Dr. H. Harris, of Babcock & Wilcox, Limited. The Joint Honorary Secretary is Mr. B. R. Byrne, British Railways Research Department, Ashford Works, Kent.

The Royal Train in New South Wales

Diesel haulage: specially redecorated air-conditioned saloons



H.M. the Queen and H.R.H. the Duke of Edinburgh on the observation platform of the Royal saloon, at Bathurst, on February 22

WHEN Her Majesty the Queen and His Royal Highness the Duke of Edinburgh visited New South Wales in February they travelled by train on three occasions: from Sydney to Newcastle, a distance of 104 miles, on February 9; from Bulli to Sydney (45 miles) on February 11; and from Bathurst to Sydney (149 miles) on February 12. The journey from Bulli to Sydney was arranged at short notice, when it was decided to travel by train instead of by road.

Non-stop journeys were made from Sydney to Newcastle and from Bulli to Sydney, but the train was slowed down when passing through large crowds. On the journey from Bathurst to Sydney the Royal party alighted at Bowenfels and rejoined the train at Lithgow, and alighted at Katoomba and rejoined at Leura. Where arrangements had been made for the Royal party to join or leave the train the station premises were specially painted in light pastel colours and were attractively decorated.

The composition of the Royal train was as follows: Two Alco diesel electric locomotives; air-conditioned composite sitting and power car, containing lighting and air-conditioning plant; air-conditioned sitting car; Commissioner's car; Premier's car; and Royal car (Governor-General's car), air-conditioned. The train had a total length of 469 ft. 4 in., and weighed 450 tons.

Diesel-Electric Haulage

The motive power was provided by two of the 20 Alco diesel electric locomotives imported from Canada and placed in service in 1951-52. Both locomotives were painted royal blue with a chrome yellow band, and the Royal coat of arms, in colour, measuring 4 ft. 6 in. by 4 ft. 9 in., was carried on the front of the leading engine.

One of these 1,750-h.p. locomotives was capable of hauling the train, but two of them were used to ensure efficiency and maintenance of timetables. Both engines were operated by one driver at the controls of the leading locomotive. The driver and the guard were connected by telephone to the Commissioner's car, so that at any point of the journey the officer in charge of the train could speak to the driver. The pilot selected to operate 15-30 min. ahead of the Royal train was a Pacific "C 38" locomotive painted green.

All the cars of the train were externally painted Tuscan red with a yellow

The Royal train near the Hawkesbury River, hauled by two Alco diesel-electric locomotives

band. On either side of the Royal car a cedar escutcheon showing the Royal arms in gold and silver was mounted.

Royal Car

The Royal car was air-conditioned by specially provided units. It contained a lounge, two bedrooms, a sitting room, a dining room, and an observation platform. The whole of the car was attractively painted, decorated, and furnished, and was carpeted in deep red.

This beautiful car was built in the Eveleigh Workshops in 1901 for Lord Hopetoun, then Governor-General of Australia. Its length over buffers is 74 ft. 6 in., the body being 66 ft. long by 9 ft. 4½ in. wide outside, with a height of 8 ft. 11 in. between floor and ceiling. It was first used by the Duke and Duchess of Cornwall and York (the Queen's grandfather and grandmother) when travelling from Albury to Jenning's (now Wallangarra) en route from Melbourne to Brisbane on May 18, 1901, after opening the first Federal Parliament in Melbourne.

It was also used by H.R.H. the Prince of Wales in 1920. Other members of the Royal family who have travelled in the car include the Duke and Duchess of York (parents of Her Majesty) in 1927, and H.R.H. the Duke of Gloucester in 1934 and when he was Governor-General of Australia in 1945-47.

Royal train and pilot engine at Sydney on February 9, before departure for Newcastle

NEW LIFTS AT HAMPSTEAD, LONDON TRANSPORT.—London Transport has installed two new automatic lifts at Hampstead, Northern Line, which, 192 ft. below street level, is the deepest tube station. They replace hand-operated lifts installed when the Hampstead tube was opened 47 years ago and are nearly three times as rapid, the descent now taking only 20 sec.

WITHDRAWAL OF PASSENGER SERVICES FROM NORTHALLERTON-HAWES BRANCH.—British Railways, North Eastern Region, announce that because of heavy losses incurred in running the service, the passenger trains on the branch line from Northallerton to Hawes will be withdrawn on and from Monday, April 26. Crakehall and Finghall Lane Stations will be closed to all traffic, and the others will continue to deal with parcels and freight. The only passenger trains to continue to run between Garsdale and Hawes will be the 3.16 p.m. Garsdale to Hawes and the 4.25 p.m. Hawes to Garsdale each weekday. The area is served by United Automobile Services Limited. There are bus stopping places adjoining Northallerton passenger station. Arrangements are being made to run trains daily including Sundays for parcels traffic, fish, and so on, and through vehicles such as horseboxes and milk vans between Northallerton and Leyburn. British Railways road motor service will provide connections on weekdays between Leyburn and Hawes. British Railways road motor horsebox services will continue to operate, with C. & D. services.

HYMATIC ENGINEERING EXHIBITS AT THE B.I.F.—The Hymatic Engineering Co. Ltd. will exhibit a comprehensive range of mobile compressor sets at the forthcoming British Industries Fair at Castle Bromwich, with displacements ranging from 9 to 50 cu. ft. per min., all based on the perfected Hydrovane rotary design. Powered either by petrol engine or electric motor, each has a volumetric efficiency of over 90 per cent at pressures up to 100 p.s.i., which it is claimed provides more air per horsepower than any other type of compressor available. The Hydrovane combines high efficiency with low weight and compactness while the method of lubrication virtually eliminates wear. The advantages of this type of compressor for mobile and portable units are so great that the firm is standardising on a series of mobile compressor sets based on the Hydrovane principle. The smallest will be the portable 303 type, a complete spray painting outfit with spray gun and a 30 ft. hose. Delivering 3·25 c.f.m. at 35 p.s.i. with a ¼-h.p. electric motor, the unit weighs only 42 lb. It provides a higher rate of coverage with any material, including Snowcem, than any other machine of less than 3 h.p.

DISPOSAL OF ROAD HAULAGE ASSETS.—The British Transport Commission and the Road Haulage Disposal Board decided in January and February that the highest prices offered for the majority of transport units in Lists 1 and 2 were not reasonable. Most of these units were recently put up for tender a second time in exactly the same form. The results for units without premises are now known. Two out of every three of these vehicles have now been sold. For the same units, the total of the highest prices offered was £583,707 as against £411,489 on the first offers, an increase of 42 per cent. The Commission and the Disposal Board have been confirmed in their view that comparatively few of the prices offered for units in the first two lists were reasonable. The bidders, it is stated, have themselves proved this and are entitled now to be told that in general their "second round" bids are reasonable, though the bids made for about one-fourth of the vehicles are still too low.

RAILWAY NEWS SECTION

PERSONAL

Mr. L. C. Stewart, Comptroller of Stores, Victorian Railways, has retired after 49 years service.

Mr. Ernesto Avila, who, as recorded in our January 8 issue, has been appointed Director-General of Railways, Peru, has had a distinguished civil engineering career. He graduated in 1928, and during the succeeding years to the present, gained surveying experience throughout the country. He came into early contact with the railways, becoming, in 1931, an assistant in the Technical Section of the Railway Department of the Ministry of Public Works. His present appointment carries with it responsibility for the General Secretariat of the Technical Experts Organising Committee due to meet shortly in Lima, and also for the General Directorate of Railways.

Mr. E. Avila
Appointed Director-General of Railways, Peru

The late Sir Arthur Watson
General Manager, London Midland & Scottish Railway, 1922-24

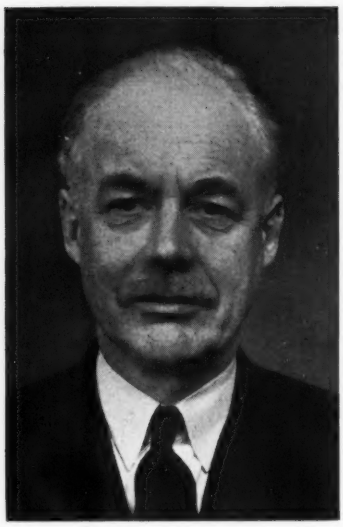
The Minister of Transport & Civil Aviation has appointed Mr. Reep Lintern to be an Under Secretary in the Ministry. Mr. Lintern, who has been Director of Sea Transport since early 1950, will now take charge of the Railways & Rates & Charges Group of Divisions.

We regret to record the death on April 13, at the age of 80, of Sir Arthur Watson, C.B.E., M.Inst.C.E., M.Inst.T., General Manager of the London Midland & Scottish Railway, 1922-24. Sir Arthur Watson, who was born in Manchester in 1873, was educated at Manchester Grammar School and Victoria University, Manchester. He gained his early railway experience on the former Lancashire & Yorkshire Railway, being articled to the Chief Engineer in 1890. During 1893-97 he served as Assistant Resident Engineer on railway works, from 1897 to 1900 was Divisional Engineer for maintenance, and, from 1900 to 1905, he was Resident Engineer in charge of extensive railway construction works. He was appointed Chief Assistant Engineer in 1905, holding that position until becoming Superintendent of the Line in 1911. During 1910 he attended the International Railway Congress at Berne, and, in 1912, he visited the United States and Canada on behalf of the company to inquire into railway practice. In 1914 he was elected a member of the Railway Executive Committee. In 1915 he became Chairman of the Superintendents' Conference of the Railway Clearing House, being re-elected for the years 1916 and 1918. In April, 1918, he was appointed Assistant General Manager, in combination with the position of Superintendent of the Line, and, on the retirement of Sir John Aspinall in January, 1919, he was selected to succeed him as General Manager. As from January 1, 1921, he received the appointment of General Manager of the London & North Western Railway in addition to the corresponding position on the Lancashire & Yorkshire Railway, and, on the amalgamation of the two undertakings, as from January 1, 1922, he became General Manager of the enlarged company. On the formation of the London Midland & Scottish Railway on January 1, 1923, he was appointed to the chief executive position of General Manager, but, in March, 1924, he retired owing to ill-health. In October, 1925, Sir Arthur Watson was appointed General Manager of the Buenos Ayres & Pacific Railway and took over his new duties on February 1, 1926. He retired from this position early in 1928. He was knighted at the beginning of 1924. Cremation was private. A memorial service was conducted on April 20 at Southernhay Congregational Church, Exeter. Among those present was Mr. A. J. Robinson, District Operating Superintendent, Exeter, Western Region, British Railways.

We regret to record the death on March 30, at the age of 83, of Mr. F. H. Graveson, Assistant to the Divisional General Manager, North Eastern Area, London & North Eastern Railway, 1923-35.

Mr. N. R. Peach, A.M.I.Loco.E., Assistant Divisional Motive Power Superintendent, Crewe, London Midland Region, British Railways, has been appointed District Motive Power Superintendent, Crewe, as from May 1. Mr. Peach succeeds Mr. James Foster, who is retiring this month.

XUM



Mr. R. Thompson
Divisional Motive Power Superintendent, Manchester, L.M. Region

Mr. W. F. Beatty
District Engineer, Crewe, L.M. Region

Mr. H. L. Robson
Assistant Estate & Rating Surveyor, L.M. Region

Mr. R. Thompson, O.B.E., A.M.I.Loco.E., District Motive Power Superintendent, Edinburgh, Scottish Region, British Railways, who, as recorded in our April 9, issue, has been appointed Divisional Motive Power Superintendent, Manchester, London Midland Region, began his railway career on the former North Eastern Railway at Darlington in 1918 as a mechanical trainee. After gaining locomotive experience in various posts at Gateshead, Malton, and West Auckland, he was appointed Shed Foreman at Shildon in 1932 and later held other positions at Kirkby Stephen, Gateshead, and Newcastle, before becoming District Locomotive Superintendent at Darlington in 1939. In 1939, Mr. Thompson was second in command of No. 1 Docks Group, R.E., having been in constant association with the Supplementary Reserve, Royal Engineers, since its formation in 1925. He was mobilised on the outbreak of war and immediately went overseas. His service took him to North Africa, France, and North-West Europe. In addition to being awarded the O.B.E. in connection with the Normandy landings Colonel Thompson had the distinction of being twice mentioned in despatches. While with H.M. Forces, he was appointed designate Assistant Locomotive Running Superintendent, L.N.E.R., at Edinburgh, and, on demobilisation with the rank of Colonel, he returned to the railway service in that post. On January 1, 1948, he became Assistant to the Motive Power Superintendent, Scottish Region, located at Edinburgh, and, on January 1, 1949, he was appointed District Motive Power Superintendent, Edinburgh. Mr. Thompson became an aide-de-camp (Supplementary Reserve) to his late Majesty, King George VI, with effect from January 22, 1952.

Mr. W. F. Beatty, who, as recorded in our March 26 issue, has been confirmed as District Engineer, Crewe, London Midland Region, British Railways, was educated at Royal Academical Institute, Belfast, and graduated as a B.Sc. with honours at Queens University, Belfast. Mr. Beatty joined the former L.M.S.R. Northern Counties Committee, in 1930, as Engineering Assistant, and transferred to the L.M.S.R. Civil Engineer's department in 1938. From 1938 until 1944 he was in charge of the concrete depot at Newton Heath and during this period acted as Resident Engineer in charge of the direct labour organisation in the north of England. In 1944 Mr. Beatty was appointed Assistant District Engineer, Blackburn, and, in 1945, he moved to Watford in a similar capacity. He became Works Maintenance Assistant at Euston in 1950, and New Works Assistant in 1951. Mr. Beatty was awarded the M.B.E. in

Mr. John Pullen
Vice-President of Traffic, Canadian National Railways, 1951-54

Mr. James A. Argo
Appointed Deputy Vice-President of Traffic, Canadian National Railways

Mr. A. T. Fussell
Appointed Publicity & Advertising Manager, New Zealand Railways

1950, and is an Associate Member of the Institute of Civil Engineers, and a Fellow of the Permanent Way Institution. He has been Acting District Engineer, Crewe, since October 19, 1953.

Mr. H. L. Robson, who has been confirmed in the position of Assistant Estate & Rating Surveyor, London Midland Region, British Railways, entered the Estate Department of the Midland Railway at Derby in 1909. He served with the Sherwood Foresters in the 1914-18 war and was awarded the M.S.M. and mentioned in despatches. He returned to the Estate Department after the war and, on grouping of the railways in 1923, he became a draughtsman in the Divisional Office at Derby. The following year he came to Headquarters at Euston in a similar capacity and subsequently became surveyor, valuer, and Head of Land Agency and General sections. In 1948, he was appointed Assistant (General), and in 1952, Acting Assistant Estate & Rating Surveyor. Mr. Robson qualified as a Professional Associate of the Royal Institute of Chartered Surveyors in 1925, and was elected a Fellow in 1928.

Mr. John Pullen, Vice-President of Traffic, Canadian National Railways, who, as recorded in our March 19 issue, is retiring, is the son of a former Grand Trunk Railway Assistant Freight Traffic Manager. He graduated from McGill University in 1912 with honours in science and entered the Freight service of the G.T.R. He served as a lieutenant with the Black Watch in the 1914-18 war, and, on returning to the railway, won steady promotion in the traffic department. In the 1939-45 war he had jurisdiction over freight activities on the Central Region, the heaviest in traffic density on the C.N.R., and was later given charge of the import and export of war materials moving over Canadian National lines through Canadian and American ports. He has been Vice-President of Traffic since March, 1951.

Mr. James A. Argo, Assistant Vice-President of Traffic for Canadian Lines, Canadian National Railways, who, as recorded in our March 19 issue, has been appointed Deputy Vice-President of Traffic for the system, was born at Norval, near Guelph, Ontario, in 1892, and began his railway career in the engineering department at Sudbury. He served with the Canadian Expeditionary Force in the 1914-18 war, and was mentioned in despatches. Returning, he joined the traffic department of the railway and served in most of the senior posts in the freight department prior to appointment to his present position of Assistant Vice-President. As Deputy Vice-President he will assume administrative duties appertaining to the traffic department as a whole. The post of Assistant Vice-President will be discontinued.

Mr. A. T. Fussell, Assistant Publicity & Advertising Manager, New Zealand Railways, who, as recorded in our April 2 issue, has been appointed Publicity & Advertising Manager of the New Zealand Railways, joined the Department in Wellington in 1926. He later occupied various positions in Canterbury, and was for some years a member of the District Traffic Manager's staff at Christchurch. In 1932, Mr. Fussell returned to Wellington to take up a position in the Department's former Publicity Branch. Here he gained a wide experience in all phases of the Department's publicity activities, which included the publication of the New Zealand Railways Magazine. Mr. Fussell joined the Armed Forces in 1940 and served with the Second N.Z.E.F. and the Fiji Infantry Brigade. On returning to the Railways Department in 1946 he was appointed to the Industrial Section of the General Manager's Staff Division, where he remained until his promotion to Production Assistant in the Publicity & Advertising Branch in 1948. Mr. Fussell, who is a graduate in Arts of the University of New Zealand, became Assistant Publicity & Advertising Manager in May, 1952.

The following staff appointments have been announced by London Midland Region, British Railways:—

Mr. G. E. Woodhead, Works Maintenance Assistant, Civil Engineer's Department, Euston, to be District Engineer, Derby (South).

Mr. J. Pollard, Assistant District Operating Superintendent, London (Midland), to be Assistant District Operating Superintendent, London (Western).

Mr. John Pollard, Assistant District Operating Superintendent London (Midland), London Midland Region, British Railways, who has been appointed Assistant District Operating Superintendent, London (Western), began his career on the former L.M.S. at Stacksteads in 1934 and, after gaining experience at various stations in the Manchester district, he became a Traffic Apprentice in 1939. He served as an officer with the Lancashire Fusiliers and the Yorkshire Hussars from 1939-1946, after which he resumed his training in the Manchester Divisional Operating Superintendent's area as a relief stationmaster in the Central Division and in the Wigan control office. Mr. Pollard was appointed Assistant to District Operating Superintendent, Crewe, in 1947, and Assistant District Operating Superintendent, London (Midland) in 1951.

Mr. V. Dennis Hare, B.Sc. (Wales), Stud. I.C.E., Bridge Section, Civil Engineer's Office, Western Region, British Railways, has been elected a graduate of the Institution of Civil Engineers. Mr. Hare's name was wrongly quoted as Mr. V. D. Dennis in our April 9 issue.

Mr. H. B. Parr, General Manager of the Sleeping, Dining & Parlour Car Department of the Canadian National Railways, has been appointed Assistant General Freight Traffic Manager for the system. Mr. Parr has been succeeded in his previous position by his assistant Mr. Harold A. Simons.

We regret to record the death at Ridgewood, N.J., on March 31, in his 92nd year, of Dr. Hermann Lemp, pioneer in electric and diesel-electric traction systems.

Metropolitan-Vickers Electrical Co. Ltd. announces that on April 1 Mr. R. H. S. Turner, M.A., M.I.P.E., was appointed Works Manager, Trafford Park Works, and Mr. A. Paterson, B.Sc., A.R.T.C.(Glasgow), A.M.I.P.E., Assistant Works Manager, Trafford Park Works.

The following appointments have been anonunced by Lansing Bagnall Limited:—

Mr. A. R. E. Arnot, B.Sc.(Eng.) Hons., A.M.I.E.E., and Mr. R. G. Winton, A.M.I.Mech.E., A.M.I.Prod.E., have been appointed to the Board.

Mr. H. P. Mott, A.M.I.Prod.E., has joined the staff of Lansing Bagnall Limited as Materials & Production Controller. Mr. Mott is Chairman of the Institute of Materials Handling.

Mr. H. M. Mathews has been appointed Director of Engineering of the English Electric Co. Ltd. He will be responsible for the co-ordination and direction of the technical policy of the company.

We regret to record the death, in his 56th year, of Mr. L. E. White, District Engineer at Erith Contracts Office for British Insulated Callender's Construction Co. Ltd.

Sir Percy Mills and Mr. W. F. C. Schaap have been appointed Directors of Babcock & Wilcox Limited. Mr. Schaap is Chief Engineer of the company. Lt.-Colonel P. D. Ionides has resigned from the board after 26 years' service.

Mr. S. E. Holmes, A.R.I.C., A.F.Inst.Pet., has been appointed Manager, and Mr. H. M. White, B.A.(Cantab.), Assistant Manager of the Department for Technical Information of C. C. Wakefield & Co. Ltd.

Sir Harry Pilkington has been re-elected President, Federation of British Industries.

Mr. F. Grundy and Mr. D. Hill have been appointed Railway representatives on Huddersfield Joint Omnibus Committee.

Sir John Hacking has been appointed President, and Sir Harry Railing, a Vice-President, of the British Electrical Development Association.

Mr. Leslie Gamage, Vice-Chairman & Joint Managing Director of the General Electric Co. Ltd., has been re-elected President of the Institute of Export for the twelfth year in succession.

Mr. Felix G. Evangelist has been appointed Export Administrator for R. G. LeTourneau, Inc., Longview, Texas. Mr. Evangelist has been engaged in the export of heavy equipment and machinery for the past eight years. He has headed his own export firm on the East Coast and also has held export responsibility as vice-president of a manufacturer of materials handling equipment.

Commander H. V. Gaud, R.N. (Retd.), having reached normal retiring age, relinquished his appointment as Manager of the Railcar Division of Metropolitan-Cammell Carriage & Wagon Co. Ltd. on March 31. He will remain for the present on the board of Metropolitan Railcars (Ganz Patents) Limited in an advisory capacity.

Commander Gaud was succeeded as London Manager of Metropolitan-Cammell Carriage & Wagon Co. Ltd. on January 1 by Mr. L. B. Alexander.

Mr. E. J. Wilson becomes Manager of the company's Railcar Division. Mr. Wilson has also joined the board of Metropolitan Railcars (Ganz Patents) Limited.

EXPORT OF SCARAB EQUIPMENT.—The sale of the Scarab Mechanical Horse and various type semi-trailers to overseas territories continues to increase. Recent shipments include 8-ton 16/18 cu. yd. all-steel end tipping semi-trailers fitted with Edbro twin under type hydraulic rams for Great Northern Railway Board (Ireland). Amongst orders recently received is one for several Scarab mechanical horses and 9 cu. yd. side loading refuse collectors, semi-trailers with light alloy bodies for the Lagos Town Council.

XUM

Ministry of Transport Accident Report

Collapse of bridge at Ardrossan, April 26, 1953; British Railways, Scottish Region

Brigadier C. A. Langley, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred at about 10.50 a.m. on Sunday, April 26, 1953, at No. 2 Parkhouse Road overbridge, Ardrossan, when an abnormally heavy load of just over 106 tons, comprising a ship's engine crankshaft and bedplate, carried on a three-axle 12-wheel trailer, hauled by a tractor weighing 15½ tons, was being moved from J. G. Kincaid & Co.'s Works, Greenock, to Finneston dock quay, Glasgow. When the rear trailer wheels reached the centre of the span the bridge collapsed, blocking both lines. Fortunately nobody was injured. Immediate steps were taken to stop rail traffic by a railwayman who witnessed the accident. The trailer was lifted back by 3.30 a.m. next morning and later the load was put into railway wagons and taken away. Normal traffic was resumed 37 hours after the collapse. This particular route had to be taken because the direct Greenock-Glasgow one had a low bridge at Langbank.

Particulars of the Bridge

The bridge was constructed in 1878 with masonry abutments and wing walls and superstructure of cast iron girders and floor plates. Loose sand filling was placed over the floor plates and the road surface was tarmac covering 4 in. thick. No renewal, alteration or strengthening of the structure had been made since it was built. It was on the skew with 26 ft. square span and 31 ft. clear road space with pavements between parapets which were carried on skew girders. There was a pipe bay with cables and water mains on one side and on the other a gas main and high tension electric cable were carried. Abutments and superstructure were in good condition. The bridge had been inspected on July 20, 1951, and again on August 22, 1952. On the former occasion the roadway was opened and the tops and bottoms of the main girders inspected. In 1952 only the undersides were checked.

The bridge had been transferred to the Ministry of Transport under Section 7 of the Trunk Roads Act, 1946, but was maintained by the Railway Executive as agents. Six of the girders, lying square to the abutments, failed, but the skew parapet girders on both sides and the three short ones on the north and two on the south remained in position.

The report of a metallurgist of the Mechanical & Electrical Engineer's Department of the Region showed that the girders were well made, true to section, free from blow holes, sand inclusions and general surface defects. The fractures were quite new and had not developed over a period of time. The cast iron was typical of the heavy castings made during last century and the micro-structures showed it to be perfectly sound soft grev iron with graphite-pearlite matrix. It had "obviously failed owing to overloading."

The total load of 106 tons 5 cwt. was distributed over the trailer axles as follows:

1st pair	:	36 tons 2 cwt.	
2nd ,,	:	35 ,,	1½ ,,
3rd ,,	:	35 ,,	1½ ,,

and the load transmitted to the road surface was greater than permitted by Paragraph 14 (j) (iii) of the Motor Vehicles (Authorisation of Special Types) General Order, 1952, particulars of which are given in the report.

After passing of the Road and Rail Traffic Act, 1933, the railway authorities calculated the strength of the bridge, assuming a continuous train of vehicles in both directions, the weight in one lane being three-quarters that in the other, with what were considered reasonable cast iron stress and impact figures, but making no additional allowance for strength derived from the road surface and so on. The cast iron arch floor plates could carry safely a 20-ton axle load, but the main girder limited the weight to five-ton vehicles, even at slow speed. It was apparently decided to allow heavier vehicles to cross for a short period and under date of January 3, 1935, the Ministry of Transport and the local authority were advised by the Chief Engineer at Euston that a permanent restriction of five tons was proposed, with a temporary one for buses and six tons for short periods.

The stress causing the failure was calculated by the Civil Engineer, Scottish Region, and gave a load of 38·75 tons considered to be uniformly distributed over 9 ft. 4 in. length of the centre girder. Tensile and compressive stress, with 10 per cent impact allowance came to 8·72 and 19·11 tons per sq. in., and without it would have been 8·09 and 17·73, a remarkable difference between assessed safe load and the actual breaking one. Numerous allowances have to be made, however, when calculating for unimpeded traffic, including contingencies for possible flaws and effect of fatigue, and a high factor of safety is applied to cover normal unrestricted traffic, although lower ones can be used for special traffic under due limitations, such as restricted speed, weight distributed over a series of axles, etc. A five-ton load would have produced a very conservative main girder tensile stress, and with two buses with 8-ton axle loads passing each other slowly an acceptable short risk only would have been incurred, but 60 tons distributed as this load was would have produced six tons per sq. in., or a factor of safety of less than 1½, much lower than any engineer would be prepared to accept. The cast iron girders were in excellent conditions and it can be assumed that they did not fail until stressed just beyond their full strength. Once a bridge has been erected, however, there is no easy way of telling whether cast iron girders have any internal defects, or fatigue flaws are developing, and such contingencies must be allowed for unless special tests are made.

Road Traffic Regulations

The statutory restrictions on road vehicle movements are contained in the Road Traffic Act, 1930, and Road & Rail Traffic Act, 1933, and Orders and Regulations under them. Section 25 of the 1930 Act gave the bridge authority power to prohibit vehicles of more than specified weight moving over a weak bridge, but it was never brought into force, neither was a similar superseding provision in Section 30 of the 1933 Act. Section 46 of the 1930 Act and Section 29, 1933 Act, contained other provisions for such control and gave the appropriate authority—the Minister in the case of trunk roads—power to restrict use of roads, bridges, etc. This particular load could only be moved under the conditions laid down in the Motor Vehicles (Authorisation of Special Types) General Order, 1952. The weight was over 75 tons and, therefore, the haulier had to give six clear days notice to the highway and bridge authorities and two to the police, excluding Sundays and Bank Holidays. This Order gives no power to prohibit movements, however dangerous, but the specified notice includes an indemnity clause.

The Traffic Operator of Pickford's Heavy Haulage Services, Road Haulage Executive, intended to send the load by the direct route on April 16, and duly advised a number of authorities accordingly, but did not then know its height. On April 22 he learned what it was, and realised that the load would have to go via the longer route. He sent out notices accordingly for April 28. The consignment was urgently needed and it proved possible to begin to move it on April 26, but the authorities were not notified of the change. The crew were experienced men and the driver in charge had often been over the bridge with heavy loads. A second tractor was coupled in front but was sent over the bridge by itself, and the other followed with the load, at about 1 m.p.h. It had just reached the other side when the driver, looking round on feeling a jerk, saw the bridge had failed. Brigadier Langley found that proper precautions were taken by the movement staff and that the driver was in no way to blame for the accident.

Indemnity Notices and Warnings

The Assistant to the Civil Engineer (Bridges), Scottish Region, confirmed the receipt of the two notices, the second of which arrived on April 25, when the office was closed, and it was not seen by him until after the accident. It gave the route to be followed, overall dimensions of the vehicle, inclusive of load, with weights and so on.

The weights and load distribution differed in several respects from those of the actual load, due to a different trailer being used from that specified in the notice.

Pickfords had been informed of the capacity of the bridge on January 22, 1951, in a communication which included assessments of five other weak bridges on the same route under the 1933 Act, the figures varying from five to ten tons for the heaviest vehicle. Pickfords had sent indemnity notices for a large number of heavy loads over the bridge which failed, 47 being received between April, 1951, and 1953, as follows:—

Loads under 20 tons	...	...	...	1
,, 20–30 tons	...	...	...	6
,, 31–50 ,,	...	...	...	24
,, 51–70 ,,	...	...	...	15
,, of 120 tons	...	...	...	1 (on 8 axles)

No action was taken on these notifications and no warning was sent to the firm, other than the letter above mentioned, nor was the railway operating department warned that heavy vehicles might be passing over the bridge.

The engineer in charge of the drawing office, Divisional Road Engineer, Edinburgh, responsible for examining notices received, confirmed having had the two in question. When he saw the weight of the vehicle exceeded 100 tons he telephoned to the Area Manager of Pickford's and reminded him of unsuitability of the route for such a load. He had had many communications with Pickford's over similar movements, and in the last two years sent out 20 warnings, with copies to the Ministry Headquarters. These letters re-

minded the hauliers of their indemnity notices and the presence of weak bridges. On one occasion in December, 1951, in connection with a similar case the warning letter said: "You have been advised previously on the unsuitability of this route but have continued to route heavy loads by it. This load you now propose to move (120 tons) is far in excess of any previous weight you have taken by this route and in the interests of public safety I sincerely hope you will prevent its movement." In spite of this the load was moved.

Pickford's Area Manager for Scotland explained to Brigadier Langley the difficulties facing road hauliers. Many loads to be moved from Greenock were very large. The direct route to Glasgow and the South along the trunk road was suitable except for the particularly low Langbank bridge. There was another low one at Port Glasgow, and a weak one at Bishopton, but he made arrangements with the railway for line protection when taking heavy loads.

The only other practical route was via Ardrossan over the weak bridges already mentioned. Severe gradients ruled others out. He admitted having received the warnings but there was nothing else he could do if he was to move the loads at all, and firms usually were anxious to get them quickly. His firm often received very little notice. Normally they telephoned to the bridge authority and sent notices later but this time only notices were forwarded, too late.

Particulars were given to Brigadier Langley of the work in hand for constructing a new bridge and also of what was being done to strengthen others. This included also removing certain bridges over disused railways and filling between abutments.

Inspecting Officer's Conclusions

The collapse was due to overloading of the main cast iron girders which, though in good condition, were not nearly strong enough to carry the weight concerned in safety. The hauliers had been warned on this and many other occasions about the unsuitability of the route for such loads and had moved this one without giving the six clear days' notice required. Not only did they fail to give sufficient notice, but substituted without warning another trailer and began the movement two days before the specified date.

Remarks and Recommendations

This accident must be viewed against the background of local and national considerations affecting the movement of heavy loads by road; otherwise it is difficult to account for the attitude adopted by the various authorities. The firm continued to use the route in spite of constant warnings, one received the day before the accident. From the railway side no further action had been taken to warn hauliers, or to stop such loads going over the bridge on many occasions, beyond sending a letter giving the bridge classifications in January 1951. In this case the indemnity notice was received too late for a warning, but there is no reason to suppose that exceptional action would have been taken had there been time. The Ministry of Transport received copies of the warning letters to the firm but no steps were taken to prohibit under Section 46 of the 1930 Act the movement of vehicles over weak bridges on this route. It must be remembered, however, that road hauliers had no option if they were to move loads at all and an Order restricting heavy vehicles undoubtedly would have met with considerable opposition from engineering interests in the area and disrupt work, much of it of national importance, until alternative methods of rail and water transport had been organised to carry these extremely large loads.

The possibility of using such does not seem to have been fully explored and in the absence of enforced prohibition, using unsuitable roads has come to be regarded as an easy way out of a local difficulty. This particular load might have been conveyed by rail as separate loads, though perhaps with some inconvenience, or by water, as it was eventually.

The solution does not lie in issuing restrictive orders but in providing adequate means of transport and removing obstacles. Reconstruction of this bridge has been under consideration for some time and alternative proposals examined. An Order under the Trunk Roads Act for a diversion incorporating a new bridge has at last been published; it is expected it will be made this year. It is to be hoped that nothing will arise to delay it, though it will not solve the difficulties of the restricted headroom of the Port Glasgow bridge, improvement of which is important and necessary, but would be costly. Early attention should, therefore, be given to strengthen the carrying capacity of the route via Ardrossan with its five weak bridges. Schemes for strengthening four could be executed readily and the fifth could, Brigadier Langley considers, be undertaken without difficulty.

The problem is not local but extends, to a greater or lesser degree, throughout the country. When the 1933 Act was passed the railway companies, anticipating being able to act under Section 30, assessed the strength of their road bridges, showing several thousand to be "weak"; most were built when road loads were much lighter. Many were on such important routes that the imposition of the proposed restrictions would have paralysed road communication in some cases and had a most severe effect on industry. These considerations were so weighty that Section 30 was never brought into force. The Ministry began a reconstruction drive under a weak bridge programme, offering grants to local authorities but few bridges were dealt with before war broke out. A number of the more important were reconstructed during it and some others on heavily loaded routes, have since been strengthened. Limited resources have prevented the re-starting of any large scale operations.

To find a better basis for assessments the Building Research Station, at the Ministry's request, embarked on full scale tests on bridges of various types in a comprehensive and elaborate manner, including the study of impact effects. As a result of this excellent work more satisfactory methods of calculation are being evolved. Discussions have been going on with the railway authorities and early agreement is expected. A re-assessment of the weak bridges over railways will then be undertaken. A list has been supplied to the Ministry of some hundreds for consideration either for re-construction or restriction under the 1930 Act. The work must be slow and laborious unless special staff is allocated to it, but will enable engineers to gauge more accurately the loads that can be reasonably carried without jeopardising safety.

Abnormal loads are increasing. Often their size is such that road movement is the only kind practicable. For many years the Ministry has been giving advice to hauliers on the routes to be taken but without means of enforcing it except by applying restrictions of the 1930 Act, done only in special cases where a bridge was considered too weak to carry the maximum weight permitted by the current restrictions and usual regulations for normal traffic. It has not been employed to prevent sporadic abnormal traffic and some risks can be justified in the interests of industry and export trade but these must be kept within bounds. This accident shows what may happen when unjustifiable risks are taken and warnings ignored. Such serious ones are rare, because signs of failure usually become noticeable. Cast iron, however, is particularly liable to sudden failure and might have flaws which cannot be detected; bridges built of it are particularly suspect.

Failure to give sufficient proper notice was not peculiar to this case. Other instances have occurred with heavy loads and even of none being given. The collapse at Auchtermuchty on July 17, 1950, is another example.

The only solution is to rebuild or strengthen bridges potentially dangerous; high priority should be given to it, but it will take many years even if planned on ambitious lines. Meanwhile all possible steps should be taken to ensure that heavy loads are not routed over bridges known to be weak.

Warnings are insufficient and bridge authorities are being asked to report cases where they are ignored. Since Section 30 of the 1933 Act was never brought into force the emphasis of recent legislation is on action by *road* rather than *bridge* authorities. Brigadier Langley is convinced that this, coupled with fear of the adverse effect of restrictions and comparative freedom from accident hitherto has led to some complacency. It is desirable, he considers, to examine the whole question with the object of exercising more effective control over road movements and make better use of other means of transport, to ensure maximum freedom for carriage of heavy loads with minimum risk to public safety.

[The report contains drawings of the bridge, load, route, etc., but these are not reproduced as neither design, construction nor maintenance was called in question; excessive overload alone gave rise to the collapse.]

New Great Belt Ferry Route

The traffic across the Great Belt between Korsor and Nyborg has much increased since the war and the State Railways have built three new diesel ferries, *Fyn* (1947), *Dronning Ingrid* (1951) and *Broen* (1952). The ferries on the Great Belt crossing now total ten, of which two, including *Broen*, are motor-car ferries.

Because of the constantly increasing number of cars it is proposed to open a new ferry route. The harbours at Korsor and Nyborg cannot take more traffic, and the approach roads and parking space are inadequate.

The new route will run from Halskov to Knudshoved, both north of the present terminals. The distance will be 18·9 km., compared with the 25 km. between Korsor and Nyborg. The crossing by the new route will therefore take under one hour instead of 1 hr. 10-15 min. A ferry will therefore be able to make six or seven round trips per day, between 6 a.m. and 12 p.m., instead of the five round trips on the present route.

The proposed new route has been submitted to Parliament by the Minister of Transport. At Halskov and Knudshoved new harbours will be built with berths for motor-car ferries, and main roads will be extended to the new harbours and suitable parking places arranged there. A new motor-car ferry will be built. The total cost is estimated at kr. 85,000,000. It is intended that the new route shall be used

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for motor-cars exclusively and be worked by the new and existing motor-car ferries, but motor-cars will also be taken by rail-day ferries on the present route when the conditions allow. Railway ferries will be able to use the new berths when engaged on motor-car conveyance.

The new crossing will also ease railway traffic. At present hundreds of wagons sometimes await the ferry. At Nyborg a fourth railway ferry berth has been built, and the station layout is being completely redesigned and modernised at a total cost of kr. 30,000,000.

Investigations are also being made for the replacement of the ferry crossing by a bridge, but such a survey will take a long time, and a bridge would take some years to erect and might cost kr. 1,500 million, it is not likely the ferry would be replaced for 15-20 years.

Dutch Visitors to London Transport

Mr. F. Q. den Hollander, President of the Netherlands Railways, last week paid a short visit to England, mainly concerned with the road passenger side of his organisation, which operates buses and long-distance motorcoaches within and outside Holland.

At the invitation of Sir John Elliot, Chairman of London Transport, Mr. den Hollander and his officers visited a number of London Transport workshops and depots, including Chiswick Works and the new overhaul factory at Aldenham now under construction and partly in use. They also spent a morning at the London Transport Railway Workshops at Acton, where they inspected the unpainted light alloy train.

Visits to Passenger Vehicle Builders

One day was spent with the A.E.C., Park Royal, and Leyland organisations, the party flying to Lancashire to visit the last-named.

During the visit the party was entertained to dinner by the Chairman and Members of London Transport, at which Sir Brian Robertson, Chairman of the British Transport Commission, was also a guest, when opportunity was taken to discuss bus and coach and electric railway car renewal and maintenance problems with Mr. A. A. M. Durrant, Chief Mechanical Engineer (Road Services), and Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport.

The arrangements for the various inspections were made by Mr. L. C. Hawkins and Mr. A. H. Grainger, Members of the London Transport Executive, and Mr. W. R. Black, of A.C.V. (Sales) Limited, and Mr. Henry Spurrier, of Leyland Motors Limited.

Accompanying Mr. den Hollander were Mr. J. P. Koster, Manager of Rolling Stock & Workshops, Netherlands Railways; Mr. J. W. H. van der Meene, General Manager of the bus engineering company associated with the regional bus companies of the Netherlands Railways; and Mr. N. Hortensius, General Manager of one of the regional bus companies.

The illustration below shows a group taken at Acton Works, with (from left to right):

Messrs. F. Q. den Hollander; J. P. Koster; A. W. Manser, Chief Mechanical Engineer (Railways), and G. Clark, Production Engineer (Railways), London Transport; N. Hortensius; Sir John Elliot; Messrs. G. S. Bingham, Assistant Mechanical Engineer (Running) (Railways), London Transport; J. W. H. van der Meene; A. H. Grainger; and E. G. Brunker, Plant Engineer (Railways), London Transport.

Staff & Labour Matters

Liverpool Overhead Railway Strike

The strike of employees of the Liverpool Overhead Railway ended on the evening of April 13 when the men decided to resume work after an assurance from the N.U.R. that negotiations with the company would be resumed for the claim for a 6 per cent increase in wages. Meanwhile a flat rate increase of 4s. for men and 2s. for women, retrospectively from December 5 last is stated to have been granted.

Sir John Elliot, Mr. F. Q. den Hollander, with officers of London Transport and of the Netherlands Railways and associated omnibus undertakings, at Acton Works

B.T.C. "Popular Carriage" Exhibition

The success of its two historical exhibitions in Coronation Year, has led the British Transport Commision to open a new exhibition at Euston Station. The "Popular Carriage" exhibition, which opened on April 22, traces the evolution of road and railway carriage design through two centuries by means of models and specimens of coaches, buses, and railway carriages.

The centre-piece of the display is an example of a 50-year-old railway horse bus which was in regular service from Tenterden Station, Kent, as recently as 1924. It was discovered a few months ago in an old stable and has since been repainted in its original bright green-and-yellow livery. Among those who travelled in it was Dame Ellen Terry who once lived at Small Hythe, near Tenterden.

Another exhibit is a mock-up of part of the interior of a G.W.R. Royal saloon of 1874. It includes a table from the original saloon, lent by H.M. the Queen from her collection at Windsor Castle. The table was presented to the Queen by the Directors of the Great Western Railway on the occasion of her marriage in 1947.

There is also a full-scale reproduction of an old Midland Railway third class compartment of 1875 fitted with an outside communication cord and a special ceiling rack for top hats. This was the first third class carriage to be equipped with soft seats.

Development in Design

The models have been arranged in two groups to show the development in design from the mail stage coach of 1820 to the latest types of buses, trams, and coaches, and from the horse-drawn railway carriage of 1826 to the most recent British Railways cafeteria car.

Other features of the exhibition are a display of railway carriage lighting from the oil lamp to the latest type of electric fittings; samples of old carriage trimmings; a Victorian Pullman chair; and a reversible "wet weather" tramcar seat of 1894. The train toilet compartment is represented by two examples of fittings of 1890 and 1900.

The history of railway carriage design is also depicted by photographic murals which are on display alongside the models, and by the projection of film strips.

The exhibition is accommodated in the former Shareholders' Meeting Room; this was designed by Philip Charles Hardwick, the son of the architect of the Euston Doric Arch, and was recently restored to its original colour scheme for this exhibition.

The arrangement and display of the exhibits has been carried out by Miss Sheila Stratton, A.R.C.A., and Mr. Peter Miller, A.R.I.B.A., and the entire exhibition is under the direction of Mr. John Scholes, A.M.A., Curator of Historical Relics, British Transport Commission. An illustrated brochure, written by Mr. C. Hamilton Ellis, is on sale at the exhibition, price 1s.

The exhibition is open to the public until September 25, weekdays 10 a.m. to 7 p.m., Sundays 2 to 7 p.m. Admission is 1s. (children under fourteen, 6d.).

The two previous British Transport Commission exhibitions, entitled "Royal Journey" and "London on Wheels," attracted a total of nearly 200,000 visitors.

Contracts & Tenders

Shell-Mex and B. P. Limited has placed an order with Hurst, Nelson & Co. Ltd. for 50 bitumen tank wagons of 15-ton capacity.

British Railways, Eastern Region, have placed the undermentioned contracts :—

Wellerman Bros. Ltd., Sheffield, 3: reconstruction of down side spandrel wall and parapets of Chelmsford Viaduct Underline Bridge

W. & C. French Limited, Buckhurst Hill: blanketing and drainage works between Yaxley and Peterborough North

J. Youngs & Son Ltd., Norwich: construction of new ticket and enquiry offices at Norwich Thorpe Station

The undermentioned contracts have been placed by British Railways, Scottish Region:—

Scottish Machine Tool Corporation Limited, Johnstone: 5 ft. dia. Loudon wheel lathe for St. Rollox Works

McKean & Co. (Glasgow) Ltd., Glasgow: improved water supply for locomotives at Cadder Marshalling Yard

British Railways, North Eastern Region, have placed orders as follows:—

J. W. Binks & Son, Morley: erection of new signalbox, type " G," Morley Top

R. W. Naylor Limited, Birmingham, 18: reconstruction of engine hot ash pit, Stourton Motive Power Depot

English Electric Co. Ltd., Liverpool, 10: welding equipment, York Carriage Works

British Railways, Southern Region, have placed the following orders:—

T. W. Palmer & Co. (Merton Abbey) Ltd., London, S.W.19 : steelwork for colour-light signal structure

Newalls Insulation Co. Ltd., Croydon: installation of heating mains, Waterloo

The Cementation Co. Ltd., Doncaster: repairs to brick linings, Midhurst Tunnel

Aubrey Watson Limited, London, S.W.1: reconstruction of bridge at Upwey Wishing Well Halt: renewal of superstructure, Portland & Easton Mermaid Bridge

D. Burkle & Son Ltd., London, N.19: office fittings, Grove Park Station

G. N. Haden & Sons Ltd., London, W.C.1: installation of heating and water services, Plumstead Goods Depot

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Trade Commissioner at Sydney has reported that the Department of Railways, New South Wales (Mechanical Branch), is calling for tenders for the supply of the following:—

One 7 ft. wheelbase trailing bogie, type " MR " for steel suburban motor car

Wheel diameter on tread 3 ft. 1 in., distance between centres of journals 6 ft. 7½ in.

The latest date for the receipt of tenders is not given in the tender documents. A copy of the tender documents including specifications and conditions of contract, is available for loan to United Kingdom firms in order of application to the Branch (Lacon House, Theobald's Road, London, W.C.1).

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Trade Commissioner at New Delhi has reported that the Director-General, Supplies & Disposals, Shahjahan Road, New Delhi, is calling for tenders for 177 gauge vacuum duplex. The closing date for receipt of tenders is May 5.

A set of the tender documents including conditions of contract but not including drawings may be inspected in Room 801 at the Branch (Lacon House, Theobalds Road, London, W.C.1) until April 24, after which date it will be available for loan to United Kingdom firms in order of application. A copy of the drawing may be had on payment from the Chief Controller of Standardisation, Central Standards Office, New Delhi, or the Deputy Chief Controller of Standardisation, Chittaranjan, India.

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Trade Commissioner at Delhi has reported that the Directorate General of Supplies & Disposals, Shahjahan Road, New Delhi 2, is calling for tenders (Tender No. SRIA/17191/D/II), for 1,000 gauges, vacuum, guards van valve, single. The closing date for receipt of tenders is 10 a.m., April 30.

A set of the tender documents, including conditions of contract but not including drawings, is available for loan to United Kingdom firms in order of application to the Branch, Lacon House, Theobalds Road, London, W.C.1.

The Special Register Information Service, Board of Trade, Export Services Branch, states that the United Kingdom Trade Commissioner at Johannesburg reports that the Stores Department, South African Railways, is calling for tenders (Tender No. F.7585) for a locomotive spotter (a mobile traction unit suitable for moving steam locomotives a short distance). The closing date for the receipt of tenders is May 6.

Tenders must be enclosed in a sealed envelope, which must have inscribed on the outside " Tender No. F.7585, Locomotive Spotter," and addressed to the Chief Stores Superintendent, P.O. Box 8617, Johannesburg. A copy of the tender documents, including specifications and conditions of contract, is available on loan to United Kingdom firms in order of application to the Branch, Lacon House, Theobalds Road, London, W.C.1.

The Special Register Information Service, Board of Trade, Export Services Branch, states (Circular F.S.B./8425/54: Ten/8962) that the British Consulate-General at Lourenço Marques has reported that the Directorate of Port, Railway & Transport Services, Mozambique, is calling for tenders for the supply of miscellaneous railway material; including coupling rings and pins, tyres, coupling jaws, springs, tubes.

To be admitted to the tendering proceedings, it is necessary to be entered in the register of tenderers at the General Stores and to give authentic documentary proof of the provisional depositing with the Administration of the sum of Esc. 12,000$00. Quotations must be given C.I.F. to the ports indicated in the tender. The closing date for the receipt of tenders is 3 p.m. on May 17.

A copy of the tender documents (in Portuguese), including specifications and conditions of contract, is available for loan to United Kingdom firms in order of application to the Branch (Lacon House, Theobalds Road, London, W.C.1).

United Kingdom firms cannot submit tenders direct but only through firms established in Mozambique whose names are registered with the Stores Department of the Treasury (Almoxarifado de Fazenda), Lourenço Marques. The Export Services Branch will supply the names of local concerns willing to act on behalf of United Kingdom firms.

The Special Register Information Service, Board of Trade, Export Services Branch, states that the British Embassy at Bangkok has reported that the State Railways of Thailand are calling for tenders for two all-steel bogie second class and six all-steel bogie third class carriages, complete with all equipment and fittings. The closing date for the receipt of tenders is May 12.

A copy of the tender documents, including specifications, drawings and conditions of contract, is available on loan to United Kingdom firms in order of application to the Branch, Lacon House, Theobalds Road, London, W.C.1.

Notes and News

Road Transport Foreman Required.—A road transport foreman is required by the Nigerian Government Railway for one tour of 12 to 24 months in the first instance. See Official Notices on page 479.

Vacancy for Foreman Fitter.—Applications are invited for the post of foreman fitter required by the Sierra Leone Government Railway, for one tour of 18 to 24 months in the first instance. See Official Notices on page 479.

Scottish Machine Tool Corporation Ltd.: Birmingham Office.—The Scottish Machine Tool Corporation Limited now has a Birmingham and district office at 2, Sir Harry's Road, Edgbaston, Birmingham, 5 (telephone Calthorpe 2541).

Locomotive Maintenance Inspectors and Running Shed Foremen Required.—Applications are invited for the posts of locomotive maintenance inspectors and running shed foremen required by the Nigerian Government Railway for one tour of 12 to 24 months in the first instance. See Official Notices on page 479.

North Lancashire Rail Tour.—On Saturday, May 1, the Stephenson Locomotive Society, North Western Area, and the Manchester Locomotive Society, are jointly promoting a North Lancashire rail tour. A special train will leave Preston at 2.10 p.m. and traverse the Longridge branch to Grimsargh. The train will then continue via Preston East Lancashire side, Tod Lane and Terington Curve Junctions, and Preston North Union side to the West Coast main line, visiting the Pilling, Glasson Dock and Sandside branches, and on the return run from Oxenholme the Lancaster Old station line. This will be the first passenger train to arrive and depart from Lancaster Old since 1849. The tour ends at Preston at 9.10 p.m.

North British Locomotive Company Results.—The group net profits of the North British Locomotive Co. Ltd. for 1953, after all charges, are £196,749. This compares with £37,236 in 1952. Taxation amounted to £164,693 (£128,859). Profits attributable to members of the holding company, after deduction of outside interests, were £194,632 (£35,945). The ordinary dividend is maintained at 5 per cent, absorbing £34,375 (same). £120,441 (£5,680) is allotted to general reserve, while the carry forward is £71,591 (£52,477). The net profit is after provi-

sion has been made for £113,626 (£261,200) for exceptional losses arising in 1953 on the contract for electric locomotives entered into in 1948. The meeting will be held on May 17.

Diesel Engine Users' Association.—On Thursday last the annual luncheon of the Diesel Engine Users' Association was held at the Connaught Rooms, London, W.C.2. Mr. F. J. Mayor, the President, was in the chair and the Principal Guest was Professor S. J. Davies, of Kings College, London.

Beyer Peacock & Co. Ltd., Results.—The combined profits for the past year amounted to £569,438 (against £448,364 for the preceding year) before charging tax of £378,005 (£276,952). On the ordinary capital increased by an issue for cash the board proposes a final dividend of 3½ per cent (the same) and a bonus of 8½ per cent (4½ per cent) making 16 per cent (12 per cent).

Southern Region Easter Holiday Arrangements.—Four hundred extra main line trains were run by the Southern Region at Easter. Numerous day excursions were available between London and suburban stations and the seaside and country. On Good Friday and Easter Sunday the normal Sunday service of trains was run, and on Easter Saturday the normal weekday service modified. A special service operated on Easter Monday.

North Eastern Region Pigeon Traffic.—The North Eastern Region of British Railways will run two special trains from Northumberland and Durham to Selby on April 24 with 35,000 pigeons to be released for the first race of the season. During the season about 900,000 birds will be conveyed and 20 special trains will run from Northumberland and Durham to Selby, Retford, Grantham, Peterborough, Welwyn, and Ashford (Kent) with pigeons for release. Later on, pigeons will be sent to Westenhanger, near Folkestone, by rail to be flown from Lympne to destinations in France. From the West Riding birds will be sent by rail and sea as far afield as Poitiers.

Mr. R. A. Young has been appointed Manager of the Birmingham office of Martonair Limited at 75, Holyhead Road, Handsworth, Birmingham (Tel.: Northern 7273). A comprehensive stock of Martonair equipment will be available within a few weeks.

Canadian National Railways City Traffic Office.—Because of increased business and the necessity to secure more commodious premises, the City Traffic Office of the Canadian National Railways in Leadenhall Street, London, E.C.3, has been changed to Orient House, 42/45, New Broad Street, E.C.2. The new telephone number is London Wall 7684, and telegraphic address Canational Ave, London.

British Railways Easter Traffic.—Fine weather brought heavy traffic to British Railways, and during the Easter holiday over 2,400 additional long-distance trains were run—about 100 more than last year—besides over 200 special excursions to football matches. During the three busiest days of the holiday 470,387 passengers travelled in 1,413 long-distance trains from the London termini alone, compared with 433,109 passengers and 1,363 trains during the corresponding period of last year. During the eight days ended 6 a.m. on April 20, British Railways cleared 2,898,420 tons of deep-mine and opencast coal, including 334,620 tons during the weekend. The total cleared during Easter week in 1953 was 2,858,620 tons. The amount of iron and steel conveyed from the principal steel works during the week ended April 10 was 227,828 tons, and 318,000 tons of iron ore also were carried.

Matling Limited : New London Office.—Matling Limited has opened new offices and showrooms at 28, Caxton Street, London, S.W.1, telephone Abbey 6652. A full range of trucks will be on show and demonstration models in a special van will be at the service of customers in the area. Matling Limited is now a subsidiary of the A.B.C. Coupler & Engineering Co. Ltd.

Metropolitan-Vickers Co. Ltd. : New Heating and Welding Department.—The heating and welding activities of the Metropolitan-Vickers Electrical Co. Ltd. have been further co-ordinated. As from April 1, the engineering sections dealing with all forms of high frequency heating (induction furnaces, dielectric heating, and so on), besides resistance heating using sheathed tubular elements, have been combined with the Welding Engineering Department, under its Chief Engineer, Mr. C. F. Saunders.

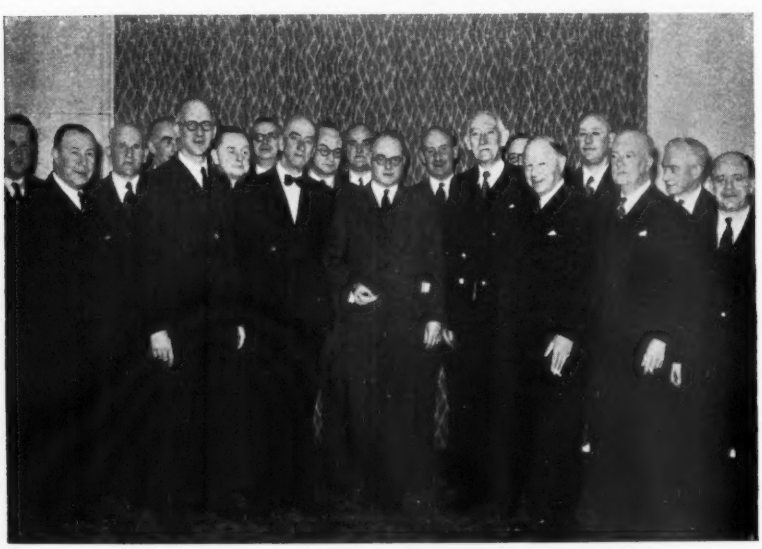
Scottish Region Ambulance Competition.—Bridgeton (Glasgow), with 248 points, won the Scottish Railways Shield in the British Railways (Scottish Region) Final Ambulance Competition held on April 13 at the Headquarters of the St. Andrew's Ambulance Association, North Street, Glasgow. Motherwell, last year's winners, scored 247. Sixty-one teams took part in the preliminary stages of the competition and a record number of 16 teams qualified for the final. The Bridgeton and Motherwell teams will represent the Scottish Region at the British Railways Inter-Regional Competition to be held in London on May 21. The prizes were presented by Mrs. T. F. Cameron, wife of the Chief Regional Manager, British Railways, Scottish Region, who presided.

Institution of Locomotive Engineers : Summer Meeting.—Provisional arrangements have now been made for the summer meeting of the Institution of Locomotive Engineers to be held this year on May 13 and 14 at Crewe, Chester and Shotton. The meeting will commence about 2 p.m. on Thursday, May 13, with a visit to Crewe Locomotive Works at the invitation of Mr. J. W. Watkins, Chief Regional Manager, British Railways, London Midland Region. In the evening the summer meeting dinner will be held at the Grosvenor Hotel, Chester. On Friday, May 14, at the invitation of the Chairman, Mr. R. F. Summers, members will visit the Hawarden Bridge Steelworks of John Summers & Sons Ltd., at Shotton, near Chester. Luncheon will be taken as guests of the directors of the company. The tour of the works will continue until 4 p.m., when the meeting terminates.

Brush Group Export Sales Conference.—At the recent second biennial export sales conference of the Brush Group at Wadham College, Oxford, Mr. Miles Beevor, Managing Director of the group, said in his opening address there were three main sales considerations which all British manufacturers had to face: quality, delivery, and price coupled with long-term credit. On this last point they were having a determined fight to match the prices of Continental competitors. The Germans, particularly, were using the weapon of long-term credit. The Group was prepared to stand up to foreign competition everywhere unless foreign manufacturers received direct aid from their Governments. Mr. Beevor did not think a creditor export incentive race with foreign competitors would be in the long-term interests of British industry. The keystone of success in the export market, he considered, was the provision of adequate service and spare parts.

International Union of Railways : Competition.—The Office for Research and Experiment (O.R.E.), Utrecht, proposes to initiate

Retirement of Mr. P. C. Durrant and Mr. W. E. Newbold



Group at a farewell party in London given by some of their many friends to Mr. P. C. Durrant and Mr. W. E. Newbold on their retirement from Paris and Boulogne respectively. (*See our issue of April* 16)

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DESIGN ENGINEER required for development of structures for Overhead Electrical Transmission Lines, Railway Electrification, Aerial Ropeways, Floodlight Towers, etc. Successful applicant, who should have had a thorough theoretical training and practical experience in the design and application of these structures, would be expected to control and organise his own Department. Good prospects are offered to a man of initiative and resource. Box 175, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LOCOMOTIVE MAINTENANCE INSPECTORS (M2C/30225/RA) AND RUNNING SHED FOREMEN (M2C/30208/RA) required by the NIGERIAN GOVERNMENT RAILWAY for one tour of 12/24 months in the first instance. Outfit allowance £60. Free passages for officers and wives and assistance towards cost of children's passages or grant of up to £150 annually for their maintenance in U.K. Liberal leave on full salary.

(M2C/30225/RA). Salary, etc., £1,307 rising to £1,453 a year with gratuity of £150 a year. Candidates must have served five year railway apprenticeship followed by at least 10 years Running Shed experience and must have reached Class II Shed Master of Class II Mechanical Foreman.

(M2C/30208/RA). Salary, etc., (*a*) in scale £750 rising to £1,035 a year with prospect of pensionable employment or (*b*) £807 rising to £1,115 a year on temporary terms with gratuity of up to £150 a year. Candidates should have served an apprenticeship in a main locomotive workshop and have had at least seven years subsequent experience in a Running Shed. They must be thoroughly acquainted with all branches of Running Shed fitting and with periodical examinations of locomotives.

Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote reference number against the post for which application is made.

GRAD. INST. T. (23) experienced in rail transportation and charges, and shipping procedure, moving to Birmingham for domestic reasons, seeks appointment in that area. Box 192, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

ROAD TRANSPORT FOREMAN required by the NIGERIAN GOVERNMENT RAILWAY for one tour of 12/24 months in the first instance. Salary, etc., according to qualifications in the scale £750 rising to £1,035 a year, with prospects of pensionable employment or (*b*) £807 rising to £1,115 a year on temporary terms with gratuity of up to £150 a year. Outfit allowance £60. Free passages for the officer and his wife. Assistance towards the cost of children's passages or grant of up to £150 annually for their maintenance in United Kingdom. Liberal leave on full salary. Candidates should have had practical experience in all sections of a motor workshop, and on heavy diesel and petrol vehicles. They should have a knowledge of turning, milling and the principles of automobile electricity. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/30248/RA.

FOREMAN FITTER required by the SIERRA LEONE GOVERNMENT RAILWAY for one tour of 18 to 24 months in the first instance. Option of appointment (*a*) on contract with gratuity of up to £150 a year and salary, etc., in scale £798 rising to £1,178 a year or (*b*) on agreement with prospect of permanency with salary, etc., in scale £742 rising to £1,092 a year. Outfit allowance £60. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 annually for maintenance in U.K. Liberal leave on full salary. Candidates must have served an apprenticeship as a Loco fitter and have had at least four years subsequent Running Shed experience. Must be able to effect service repairs and to maintain locomotives between shopping periods. Must be conversant with WALSCHERT valve gear. Diesel experience desirable. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/30493/RA.

INTERNATIONAL UNION OF RAILWAYS. The Office for Research and Experiment (O.R.E.) proposes to initiate a competition for the design of a Standard Wagon of the future. This will be open to all companies, design offices or private persons against an entrance fee of 2,000 Dutch guilders, about £200. The object of the competition is to encourage the development of new technical conceptions in the design and manufacture of railway wagons leading to a better economy in the provision and use of wagons. The ways in which this improved economy could be sought are defined in the Conditions of the Competition. The competitors' proposals will be examined by a Jury formed of Railway Specialists and Specialists from the Wagon Building Industry. The competition will carry prize money to a total of 120,000 Dutch guilders, about £12,000. Winning solutions might be the subject of further development after the prototypes, which will be tested, have been built. The industrial rights of ownership will be respected for solutions which are accepted. Entries for the competition will be received by: The President of the Office for Research and Experiments (O.R.E.), Headquarters of Nederlandsche Spoorwagon, IIIrd Building Moreelsepark 1, UTRECHT (the Netherlands), from June 1, 1954, to June 30, 1954, inclusive. The competitors' disposals should be dispatched before December 31, 1954. The entry fees should be paid to the credit of the Nederlandsche Spoorwagon at the Twentsche Bank, Amsterdam, under the reference "Concours O.R.E. B 12." The final conditions of the Competition will be available on application to the O.R.E. Bureau, Moreelsepark 1, Utrecht, after May 15, 1954.

TRANSLATIONS (Technical, Research, Commercial), all languages carried out by experts. Instruction manuals, patent specifications, conference papers, brochures, sales literature. Abstracts also supplied. Olympia Translation Service, 149, Blythe Road, London, W.14. RIVerside 5135.

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a competition for the design of a standard wagon of the future. This will be open to all companies, design offices, or private persons against an entrance fee of 2,000 Dutch guilders, about £200. Full details of this competition will be found under Official Notices on this page.

Eastern Region: Men's Ambulance Competition.—In the final of the Eastern Region Men's Ambulance Competition, held at Bishopsgate Institute on April 7, the winners were a team from Kings Cross Motive Power Depot. Mrs. A. J. White, wife of the Assistant Chief Regional Manager, presented the Eastern Region Bowl to the leader of the team, and each member received a barometer. The Kings Cross team and that from Yarmouth, which gained second place, will represent the Eastern Region at the Inter-Regional Competition on May 21.

Thos. Firth & John Brown Limited.—In his statement to the members of Thos. Firth & John Brown Limited, the Managing Director, Mr. C. Sykes, stated that in the year ended October 3, 1953, output in weight was 14 per cent in excess of that for 1952 and turnover was 6 per cent higher in value. The manufacturing and trading profit compared favourably with that for 1952 excluding windfall profits. This result was considered satisfactory. The aggregate value of incoming orders had been considerably less than the aggregate value of deliveries of the main sections of production. A major development plan estimated to cost £3,000,000 was in hand and would take at least five years to complete.

R. A. Lister & Co. Ltd.—The report and accounts of R. A. Lister & Co. Ltd., for the year to September 30 last show a group net profit of £607,099 (£677,073) before charging net taxation of £385,701 (£399,057). The net profit of the parent company, after tax, was £209,832 (£203,090). The ordinary dividend for the year is raised from 9 to 12 per cent requiring £171,600 (£122,850). General reserve receives £30,862 (nil). The amount carried forward is £386,012 (£388,317). The consolidated net current assets are £178,000 higher on the year at £4,113,000. The home and oversea demand for the company's electric generating units and marine propulsion and auxiliary engines is stated to have shown a "gratifying" expansion.

Wagon Finance Corporation: Distribution Increased.—The board of the Wagon Finance Corporation has proposed raising the total distribution by the equivalent of 10 per cent on the present paid-up capital of £250,000. A final dividend of 12½ per cent plus a bonus of 6¼ per cent is now recommended, to make with the paid 6¼ per cent interim a total of 25 per cent for the year. For 1952, an interim dividend of 5 per cent on £125,000 was followed by a 12½ per cent final dividend on the capital as doubled by the paying up from reserves of a further 2s. per share on the issued £1 shares, the total distribution being equal to 15 per cent on the present amount. The consolidated net profits, after tax, are £73,016, an increase of £20,863 over the 1952 figure of £52,153. The general reserve again receives £25,000 and the carry-forward is raised from £111,393 to £125,035. It is also proposed by the directors that borrowing powers be raised from £2,000,000 to £4,000,000.

Nitrate Railways Co. Ltd. Report.—The report of the Nitrate Railways Co. Ltd. for the year ended December 31, 1952, states that progress has been made towards the implementation of Decree No. 435, under which the Chilean Government took formal possession of the company's undertaking on September 1, 1951. The purchase price of pesos 55,790,648 has been deposited with the Fiscal Treasurer but shareholders out of Chile are likely to receive little of the amount and will be dependent on the sale of other assets such as locomotives, rolling stock, stores stocks and so on. These matters are not yet sufficiently advanced for the voluntary liquidation of the company to be proposed.

Craven Bros. (Manchester) Ltd.—The profit on the operations of Craven Bros. (Manchester) Ltd. for 1953 was £306,895, compared with £303,057. After all charges, including depreciation of £25,000 and taxation of £172,000 (£174,000) the net profit, as reported on April 2, was £96,384 (£88,740). The final ordinary dividend is to be 12½ per cent.

Superheater Co. Ltd.: 1953 Results.—A profit for 1953 of £220,493, compared with £179,189 for 1952, is announced by the Superheater Co. Ltd. This figure includes £5,655 (£6,142) interest and allows for a provision of £288,912 (£220,018) for taxation. An addition of £15,000 (£71,862) is made representing a provision made in past years but no longer required. Revenue reserves receive £158,000 (£145,000). Nothing is placed to capital reserve (against £43,800 in 1952). An interim dividend of 6d. a share has already been paid on the 1,234,800 (1,058,100) ordinary and "A" ordinary 5s. shares. A final dividend of 1s. 6d. a share (1s. 3d.) is now recommended. It is also intended to capitalise £154,350 of general reserve to be applied in distributing 242,700 ordinary 5s. shares, fully paid, and 374,700 fully paid "A" ordinary shares. One ordinary share or one ordinary "A" share will be distributed for each two shares of the same category held on May 11.

Dorman, Long & Co. Ltd.—The report for the year ended October 3, 1953, of Dorman, Long & Co. Ltd. shows a net profit of £3,097,273 to which is added a balance of £145,237 from the previous year. Of this total £2,750,000 is placed to general reserve and £104,896 has been used for the interim dividend. The final dividend

proposed takes £219,782 and £167,832 is carried forward. The total of interim and final dividends is equivalent to 7·976 per cent (less tax) on the issued share capital. The statement of the Chairman, Sir Ellis Hunter, draws attention to the group trading profit for 1953 of £7,863,972, which is a record. Output of ingots at 1,759,079 tons for the 53 weeks and rolled steel at 1,470,607 tons was also a record. Capital expenditure during the year amounted to £4,750,000, which included over £2,000,000 in the new open hearth steel plant at Lackenby.

Conducted Tours of Cambridge and Ely.—The Eastern Region of British Railways has brought out an attractive folder publicising the conducted tours of Cambridge and Ely which are being offered this summer. The tours of Cambridge only will be made every Wednesday from May 19 to September 22, those combining both towns every Thursday from May 20 to September 16. The cost of the Cambridge tour, including rail journey from Kings Cross, transport from Cambridge station to city, lunch and services of guide is 21s. 6d. (third class rail). The tour of both Cambridge and Ely will cost 27s. 9d. (third class rail). There is also an afternoon tour of Cambridge offered for 13s.

New British Railways Folder.—A new British Railways folder entitled *Britain*, for circulation on the Continent, has been designed and illustrated by Mr. F. Donald Blake to the requirements of the publicity departments of the Eastern and Southern Regions. Lavishly illustrated in colour by the artist, it is intended to provide an inducement to Continental tourists to visit this country and "See Britain by Train." Inset pages, with a map of Great Britain and the Continent, contain information on the facilities which British Railways have to offer. Sixty-thousand copies, printed in five languages, English, French, German, Dutch and Italian, will be distributed to travel agents throughout the Continent.

Forthcoming Meetings

April 24 (*Sat.*).—British Railways, Southern Region, Lecture & Debating Society. Morning visit to the National Physical Laboratory at Teddington.

April 26 (*Mon.*).—Institute of Transport, Berks, Bucks & Oxon Section, at 22, Thorn Street, Reading, at 7 p.m. Paper on "Transport in industry," by Mr. J. H. Criddle, followed by annual general meeting.

April 27 (*Tue.*).—Institute of Transport, at the Connaught Rooms, Great Queen Street, London, W.C.2, at 12.30 for 1 p.m. Informal luncheon.

April 28 (*Wed.*) to May 1 (*Sat.*).—Institute of Welding, Spring Meeting, in South Wales and Bristol.

April 30 (*Fri.*).—Stephenson Locomotive Society, North Western Centre, at the Liverpool Engineering Society's Rooms, Dale Street, at 7.45 p.m. Illustrated lecture, "Great Northern cavalcade," by Mr. R. A. H. Weight.

April 30 (*Fri.*).—British Railways, Southern Region, Lecture & Debating Society. Visit to York.

May 1 (*Sat.*).—Stephenson Locomotive & Manchester Locomotive Societies, at 2.15 p.m. Special train tour from Preston to Longridge, Knott End Railway, Glasson Dock, Sandside, etc.

May 1 (*Sat.*).—Permanent Way Institution, East Anglia Section. Visit to Lowestoft Harbour Works and Sleeper Depot.

May 3 (*Mon.*) to May 12 (*Wed.*).—Institute of Transport. Visit to France.

May 4 (*Tues.*)—Railway Students' Association. Morning visit to London Transport Loughton Garage.

May 4 (*Tues.*) to May 6 (*Thus.*).—The Society of Engineers (Incorporated). Centenary celebrations.

May 7 (*Fri.*) to May 9 (*Sun.*).—Institute of Traffic Administration. Annual Conference at Prince of Wales Hotel, Southport.

May 7 (*Fri.*).—The Railway Club, at 57, Fetter Lane, London, E.C.4, at 7 p.m. Paper entitled "By Rail to Lapland," by Mr. R. Burrows.

May 8 (*Sat.*).—Permanent Way Institution. Visit to Toton Marshalling Yards, London Midland Region.

May 10 (*Mon.*).—Historical Model Railway Society, at the headquarters of the Stephenson Locomotive Society, 32, Russell Road, London, W.14, at 7 p.m. Talk entitled "Railway photographs from my collection," by Mr. George Dow.

May 11 (*Tue.*).—Institution of Civil Engineers, at Great George Street, Westminster, S.W.1, at 5.30 p.m. Paper on "Wear of steel rails; a review of the factors involved," by Mr. J. Dearden.

May 11 (*Tue.*).—Road Haulage Association, at Grosvenor House, Park Lane, W.1, at 12.30 for 1 p.m. Annual luncheon. Principal guests, Mr. Alan Lennox-Boyd and Lord Brabazon.

May 26 (*Wed.*) to May 29 (*Sat.*).—British Railways & London Transport Exhibition of latest developments of railway locomotives, rolling stock, and engineering equipment at Willesden Motive Power Depot. Wednesday 3 to 7 p.m. Thursday to Saturday inclusive, 10 a.m. to 7 p.m.

Railway Stock Market

Although rather less buoyant, stock markets have remained extremely active with further gains in the gilt-edged and industrial sections. British Funds have been favoured on the view that sooner or later the bank rate is likely to be reduced to 3 per cent. Many dividend increases and more share bonuses from some prominent companies also helped sentiment considerably. They emphasised that, though the Budget failed to bring a reduction in income tax, the tendency for companies to pay rather more liberal dividends is continuing. The share bonus announcements of Vickers and Cammell Laird have provided further evidence that there is a growing disposition to bring issued capital more into line with a company's resources, which have of course been increased substantially since the end of the war by the large proportion of net profits added to reserves.

The many share bonuses now being announced do not necessarily mean bigger dividend payments, though it is generally assumed that future amounts of cash dividends on the larger capital are likely to be slightly higher. Some companies, however, warn that the amount of cash likely to be distributed in future dividends will probably be unchanged. A factor not perhaps as widely recognised as it should be, is that now growing competition and lower profit margins are in evidence in most industries, it must be expected that financial results and also dividend payments will vary from year to year. The stable dividends which have hitherto featured company results since the end of the war cannot be expected to continue. On the other hand, just as some companies will find it difficult to meet the much more competitive conditions, those who succeed and expand turnover or output may earn bigger profits and pay higher dividends.

Manila Railway stocks were a big feature in foreign rails on the reported purchase of the Manila Railway bonds by the Philippine Government. The "A" debentures soared £19 to £125 on Tuesday, "B" debentures £30 to £124, the preference shares 3s. 6d. to 17s. 9d., and the 1s. ordinary rose to 8s.

Antofagasta stocks became firmer, with the ordinary 8½ and the preference 40½xd. United of Havana stocks continued firmly held, the second income stock being 43¼ and the Consolidated stock 6¾.

Canadian Pacifics strengthened to $44¾, while the 4 per cent preference stock was £65 and the 4 per cent debentures £89½. White Pass no par value shares turned firmer at $24¾ with the convertible debentures £88½ and the loan stock £33¾.

Mexican Central "A" debentures were 78½. In other directions, San Paulo units were 5s. 6d. and Nitrate Rails shares 20s. Taltal Railway shares changed hands around 14s. 6d. and Brazil Rail bonds at 6¼. Dorada Railway ordinary stock transferred at 75 and Guayaquil & Quito first bonds at 50½. Costa Rica ordinary was dealt in at 8½ and the second debentures around 44¾. Chilean Northern 5 per cent debentures have transferred at 26½.

Business around 21 was recorded in Emu Bay 5 per cent debentures. Midland of Western Australia changed hands around 22½ and the second debentures at 41. Among Indian stocks, Barsi marked 126.

The shares of locomotive builders and engineers remained prominent under the influence of the improved earnings and higher dividends which have featured most of the results issued recently. Those of Beyer Peacock created an excellent impression and the shares were marked up 2s. 6d. to 39s. 4d. Vulcan Foundry at 27s. 3d. continued active on the past year's figures, while North British Locomotive at 17s. also remained under the influence of the financial results. Gloucester Wagon 10s. shares were 17s. 6d. Charles Roberts 5s. shares moved up to 9s. 9d. and Wagon Repairs 5s. shares were 12s. 6d. G. D. Peters 5s. shares changed hands around 24s. and at Glasgow, Hurst Nelson were 42s. Birmingham Carriage were 28s.xd.

Engineering shares generally continued to attract attention because of the benefits expected to be derived from the tax concession in respect of new plant. Babcock & Wilcox were good at 56s. on hopes of a dividend of 13 per cent for the year. Vickers at 58s. 6d. have reflected profit-taking following the results, sentiment being influenced more by the absence of an increase in the dividend, which is kept at 15 per cent, than by the 100 per cent share bonus.

On the other hand, Cammell Laird 5s. shares advanced to 17s. 9d. following news of the big tax free payments which accompany the unchanged dividend and the proposed share bonus. Guest Keen were up to 58s. 9d. on higher dividend hopes, and T. W. Ward rose to 91s. 9d. F. Perkins shares at 34s. 9d. have eased a little in price since dealings started officially.